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Testing the Suitability of Dyes for Viscose Rayon

Problem of Obtaining Level Dyeings on Rayon—Whittaker's Researches—A New Rapid Test—The Procedure and Material Used—Special Conditions

By A. J. HALL, B.Sc., F.I.C., F.T.I.

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SINCE the introduction of rayons, particularly those of the regenerated cellulose types, including viscose and cuprammonium but not cellulose acetate, dyers have experienced great difficulty in avoiding uneven dyeing. Dyers find that if skeins of rayon taken at random from different batches of yarn are dyed together in the same dye vessel, it is seldom that such skeins dye to the same shade. It will be found that some skeins dye to a light shade, others to a medium shade, and others to a dark shade. In other words, it is found that cellulose artificial silks vary as regards their affinity for dyestuffs. This lack of uniformity of dyeing affinity reflects itself as faults in woven and knitted goods manufactured from such yarns. For instance, in woven fabric containing an artificial cellulose silk weft the fabric may change in color with each change of cop or pirn; in knitted tubular material for the manufacture of which a number of bobbins of yarn are used simultaneously, a light and dark barred appearance is produced. As might be surmised, dyers are expected to overcome these defects as much as possible.

Some eight years ago Wilson and Imison of Courtaulds, Ltd., discovered that unevenness of dyeing affinity in a cellulose silk was revealed more by some dyestuffs and less by others, and the suggestion which naturally followed was that dyers should use those dyes which revealed the differences of affinity least. At that time it was also suggested, in view of the fact that the dyes found to reveal the different dyeing affinities of the silk very clearly were of high molecular weight (for example, Chlorazol Sky Blue FF; mol. wt. = 992) whereas those which revealed the differences only but slightly were of low molecular weight (for example, Indoine Blue; mol. wt. = 521), that the most useful dyes for viscose and other cellulose silks would probably be those of low molecular weight.

Whittaker's Researches

After this the matter of the suitability of dyes for application to viscose rayon was investigated very thoroughly by C. M. Whittaker, also of Courtaulds, Ltd., and his results have been of the greatest assistance to all dyers of viscose materials. In the first place, Whittaker examined all available dyes and classified them into three groups *even, moderately even* and *uneven,* an even dye being one which reveals least the difference of affinity shown by different silks. These classified lists of dyes are to be found published in the textile journals. Subsequently Whittaker discovered that when a length of viscose yarn was suspended vertically so that its lower end is immersed in a dye solution, the colored dye liquor will raise up the yarn to a comparatively much greater height if the dye is an uneven one than if it is even. Obviously, a test for the even-dyeing properties of dyes for viscose silk can be based on this discovery. But it is evident that the capillary forces which play a part in a test of this character will be influenced by the structure of the yarn, and for this reason the test is not always reliable. It has therefore given place to another test, also devised by Whittaker.

This other test which has been published in the technical press and is now known as the "temperature range" test, really consists of a determination of the temperature at which a dye has its maximum affinity for viscose silk. Experience shows that those dyestuffs which show a maximum affinity for viscose silk at 20° C., give the most even dyeings in large

scale work on commercial viscose, while those dyestuffs which show maximum affinity for viscose at 90° C., give the most uneven dyeings. Actually, the test is carried out by dyeing eight skeins of viscose silk (the skeins should have equal dyeing affinities) in eight similar dye baths each maintained at a different temperature, e. g., 20°, 30°, 40°, 50°, 60°, 70°, 80° and 90° C. After dyeing the skeins are rinsed, dried, and compared as regards their depth of shade.

It will be realized that both the "thread capillary" test, and the "temperature range" test, require an amount of preparation and time which practical dyers are not always able to spare, and that it is desirable that a test more simple and rapid should be available. Such a test will now be described.

In the early part of 1927 the writer described before the Manchester Section of the Society of Dyers and Colourists the results he had obtained during some investigations on the change of dyeing affinity produced in viscose silk by treatment with caustic soda solutions. It was noted that in general viscose silk immersed in solutions of caustic soda of 3 to 6% swelled considerably, and when freed from alkali by acidification and thorough washing with water, it showed an increased affinity for certain dyes but not for others. The results obtained at that time indicated that the alkali-treated viscose silk showed an increased affinity for uneven dyes (as classified by the methods of Whittaker) while it had the same or only slightly greater affinity for even dyes. It is on those facts that the new test is based, this test having now been used with satisfaction for over two years in the laboratories of the Silver Springs Bleaching & Dyeing Company, ltd.

Procedure of the Test

For the purpose of the test, it is advisable to put into storage a sufficient quantity of yarn for a large number of tests; any denier of yarn can be used, the writer having found 150-denier (weft yarn), 175-denier (knitting yarn), and 3,500-denier (knitting twist yarn for jumpers, etc.) suitable. The whole of this yarn is assumed to have the same dyeing affinity, and should therefore be selected from the same consignment of viscose. One half of the yarn, in skein form, is then uniformly immersed for four hours at room temperature in a 5% solution of caustic soda, the quantity of liquor being immaterial so long as the skeins are completely covered. Afterwards, the yarn is well washed with water, soured with dilute hydrochloric or acetic acid, thoroughly washed free from acid with water, hydroextracted, and dried at about 50° C.

In testing the suitability of a dye for viscose or other cellulose rayon, it is merely necessary to dye together (under conditions similar to those employed in large scale practice) lengths of alkali-treated and untreated silk; if the dye is an even one, the two lengths of dyed yarn will have nearly the same shade, whereas if the dye is an uneven one, and therefore unsuitable, the alkali-treated silk will be much deeper in shade than the untreated silk.

It is well known that the dyeing evenly of viscose silk is much more difficult when mixtures of two, three, or perhaps more dyes are necessary, and that the correct selection of dyes is then more important than ever. Under such circumstances, the correctness or otherwise of the mixture may be conveniently tested before use by means of the alkali-treated and untreated silks.

Special Fabric Used

The writer has found that instead of using separate lengths of alkali-treated and untreated viscose silk, it is much more convenient to use pieces of fabric constructed of a cotton warp, and a weft consisting of alternate bars of alkali-treated and untreated viscose silk, or knitted tubular material consisting of alternate bars of the two types of silk. When such a piece of material is dyed, the bars dye to different depths of shade when the dye is uneven, but to almost the same shade if the dye is even. In this manner the test is simplified.

This new test is recommended because it is accurate, simple and rapid; it can be carried out, if necessary, within about five minutes, although, of course, it is preferable to prolong the dyeing for 15 to 30 minutes. It enables practical dyers to test themselves the suitability of any dye or mixture of dyes for viscose rayon materials independently of the claims made by the manufacturers of such dyes for dyeing viscose or other cellulose fibers.

The Carrier Engineering Corp., specialists in air-conditioning, drying, processing, and refrigeration, has purchased the four-story factory and office building at 850 Frelinghuysen Avenue, Newark, N. J., formerly occupied by the General Electric Company. The new location offers a floor area of approximately 112,000 square feet, a large share of which will be occupied by the manufacturing division for making extended surface heater and the new Carrier development for household heating and air-conditioning. The experimental and research laboratories will be provided with largely increased space and facilities.

The Palisade Converting Company, recently organized with a capital of $100,000, to operate a mill at Union City, N. J., will be represented by Edward J. Abramson, 790 Broad Street, Newark, N. J. The company is headed by Samuel Busch, 393 Palisade Avenue, Jersey City, N. J.

The Analysis of Sulphonated Oils

Water and Ash Tests—Titration Methods of American Leather Chemists' Association—Advances Over Older Methods—The Preferred Sample

By W. H. THOMAS

THE author of a recent article mentions the variety of percentage systems used for sulphonated oils and feels that it would be of advantage to standardize on the amount of non-volatile matter—that is, the part that is not water. We will show later on why this is unsatisfactory, but it touches at once a very important point, the percentage of water. This is easily determined with good accuracy. The method which we use in our laboratory is a modification of that of Dean and Stark, published in the Journal of Industrial and Engineering Chemistry, May, 1920, page 486.

Water.—Fifteen or twenty grams of the sample are weighed into a round bottom short neck 200 c.c. Pyrex flask. Add about 125 c.c. of dry benzene-xylene, 1-4 and attach a special graduated measuring tube whose diameter and graduations are about the same as on a burette, and then a reflux condenser. This entire outfit is shown in the illustration. Distill till no more water can be obtained, as shown by the reading remaining constant. If foaming interferes, Red Oil (oleic acid) or tartaric may be added. Glass beads may be added to control bumping. Dry solvents are used because at the end of the test nearly the entire amount of solvent is held in the flask, dry. When the amount of water is small, such as 1 c.c., the results are slightly low on account of water dissolved in the solvent.

We are frequently told that textile mills want merely comparative tests on these oils, and yet in a recent article the results of the tests reported upon showed such wide variations as to preclude any but very rough comparisons. The above water determination will give good check results between various workers and will permit a fair comparison of strength.

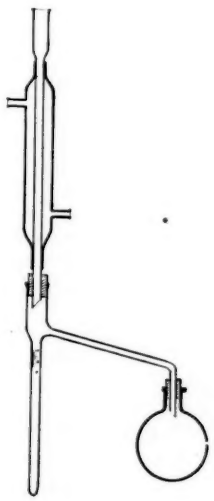
However, it will not tell whether the sample contains an excess of salts such as NaCl, Na_2SO_4. Some sulphonated oils contain quite a quantity of salts, and by considering all the non-volatile matter as oil, will appear to be stronger than they really are. For this reason it is not satisfactory to rate oils by their non-volatile matter only. It is worth while to determine the ash also.

The Ash Test

Ash.—Weigh 2 or 3 grams into a crucible or dish. Ignite gently, allowing to burn. Complete the burning at low heat until all carbon is consumed. The ash contains salts which are easily fusible. It is important to complete the combustion below the fusing point of these salts. Once they are melted, they flow over and prevent the burning of the organic matter. If this occurs, it is necessary to cool, add distilled water, dry cautiously, and re-ignite.

The difference between 100 and the sum of the water and ash is taken as the Total Fatty Matter. If it is an ammonia product, the per cent of ammonia should also be deducted. It is possible to introduce a few further corrections, but they are not of very great importance. In fact, the exact per cent of fatty matter is of less importance than it is often considered to be. There are other factors which are of great value in determining the value of these oils.

During the last ten years the analysis of these oils has been much advanced by the work of the American Leather Chemists' Association. These chemists came to the conclusion that there were so many disadvantages to the known direct methods for determining the fatty matter that it was better to arrive at this indirectly. Their experience led them to the conclusion that all direct methods discriminated more or less against oils of better



quality. Methods in common use do not check well, whereas water and ash results do give good checks.

Titration Methods

In order to understand the titration methods of the American Leather Chemists' Association, it is desirable to consider that H_2SO_4 unites with oil to form a compound which may be symbolized as H-Oil-SO_4; and that this, when neutralized, becomes Na-Oil-SO_4. This does not involve any theory as to just how the acid is com-

bined with the oil, whether at the OH group or elsewhere. It simply represents a typical compound of H_2SO_4 on the order of $HNaSO_4$ and Na_2SO_4. Titrations are carried out as follows:

A. Weigh 10 grams into a 250 c.c. Erlenmeyer. Dissolve in 150 c.c. water, warm if necessary. Add granulated salt, 30 grams. Ether, 25 c.c. Methyl Orange indicator, 5 c.c. Titrate with half-normal acid. Express the result as c.c. of half-normal solution per one gram of sample and call this A.

D. Weigh 8 grams of the sample into a 500 c.c. beaker. Add 50 c.c. of 95 per cent alcohol and several drops of phenolphthalein indicator. Titrate with half-normal NaOH until pink. Boil gently until no more ammonia is given off, as tested for with moist red litmus paper. Cool and add more NaOH until the pink color persists. Again boil to drive off any remaining ammonia. Add NaOH after cooling to bring to end point. This point must be accurate, as the next test must start from a neutral solution. May be corrected with acid if necessary. Hold the solution for the next test. Express the result as c.c. of half-normal solution for 1 gram of sample and call this D.

B. To the above solution add 150 c.c. water and 5 c.c. Methyl Orange indicator and titrate to acid end point with half-normal acid. Express this as c.c. of half-normal solution per gram of sample and call this B.

F. Weigh 8 grams into a 300 c.c. Erlenmeyer and add 25 c.c. of normal sulphuric acid. Use glass beads to prevent bumping and boil with reflux condenser for one hour, shaking the flask frequently. At the end of the hour wash the condenser into the flask. Cool; add about 20 c.c. of Ether, 100 c.c. of distilled water, 30 grams of granulated salt and 5 c.c. of methyl orange indicator. Titrate with half-normal NaOH; stopper the flask and shake during titration. Deduct the acid added from the equivalent amount of NaOH used and express the difference as c.c. of half-normal solution for one gram of sample, calling this F.

Conversion

We now have, in terms of half-normal solution, several factors from which we can get a very good understanding of our sample. The American Leather Chemists convert these to milligrams of KOH per gram of sample, but there is no need to do this. To convert any of these factors to actual per cent, multiply by the molecular equivalent for 100 c.c. of half-normal solution. That is, for

Na_2O	1.55
NH_3	0.85
Oleic Acid	14.10
Ricinoleic	14.90

A represents the total alkali present. Also combined fatty acid.

B represents the total fatty acid, both free and combined.

B minus D equals C, the non-volatile alkali.

A minus C is the ammonia.

F plus A represents the combined sulphuric acid. On the ground that the sulphonated compound may be represented as the neutral body Na-Oil-SO_4, which contains enough Na to combine with half the SO_3 that is set free, the factor 4 is used to get the per cent of SO_3. This is evidently not quite correct, and frequently leads to results a little high. As a matter of fact, it is hardly impossible that a compound on the order of Na-Oil-SO_4 would be entirely neutral in the presence of a certain amount of free fatty acid.

These represent a distinct advance over the older methods. The American Leather Chemists go further and give methods of figuring from these factors what part of the ash should be sodium carbonate, what part should be sodium sulphate from the combined SO_3, and what part is due to mineral salts in the oil. They also depend upon these figures to find out how much of the oil is no longer in its original state as a neutral oil. We find these somewhat impractical. They often show more salts in the ash than the entire amount of ash found.

The Leather Chemists advise finding the total fatty acid by converting the factor B to Oleic Acid. This may be suitable for many of the oils they deal with, but it does not seem to be suitable for castor oil products. It leads to much higher figures for neutral oil than any other method, much higher than reasonable. We carried out a trial in which no neutral oil was present; the oil sulphonated was in the form of fatty acid. We still found that the factor B showed considerably less fatty acid than was known to be present. This is understandable if we keep in mind what is said in oil literature about polymerized fatty acids. The Leather Chemists in their journal advise using a figure corresponding to an acid value of 180, which calls for a molecular weight of 310. We found in the above trial that the acid number was nearer 170, which calls for a molecular weight of 324. We are inclined to think that this represents the degree of polymerizing present. We do not place much reliance on their method of arriving at the neutral oil by difference.

The Preferred Sample

However, it is probable that many chemists overestimate the importance of the neutral oil, anyhow. It matters far more how far the fatty matter is sulphonated than how much is unchanged. The term sulphonated oil is often used, apparently meaning neutral oil, but the unsulphonated fatty acid is overlooked. For many purposes a sample with more neutral oil and less unsulphonated fatty acid is much to be preferred to one with no neutral oil and considerable soap.

It is evident that when the per cent of SO_3 is not more than 8, the amount of oil combined with this, using the

molecular weight 298, cannot be more than 29.8. The amount of unsulphonated fatty acid present in a good quality of Turkey Red oil is usually more than the amount that is sulphonated. As a matter of fact, the SO_3 runs more frequently about 3 or 4% and not often so high as 8%.

The time required to put through these tests is not over three hours. The original reports on these methods will be found very valuable to anyone wishing to make a thorough study of this subject. They are found in the Journal of the American Leather Chemists' Association.

Bleaching and Dyeing Muga Silk

The Wild Silks—Three Worm Species—Cultivation of Muga—A Home Industry—Bleaching Methods—Dyeing Not Difficult

By FRED. GROVE-PALMER, A.I.C.

THERE are three kinds of so-called "wild" silks grown in India which have a certain importance in the economic statistics of the country: the most important of these is Tussah; after that comes Muga, and third is Eri.

Muga, however, although it is classified as being a wild silk, is actually grown in a more or less domesticated state, and the supplies that are brought into the various markets are the produce of small farmers; and though it is sometimes said that the wild hill tribesmen of Assam bring in loads of really wild cocoons, the late Professor Maxwell-Leroy, who made a very extensive survey of the silk production of India, took leave to doubt that this was really the fact; he believed that it was all bred in captivity. There are wild moths, of that there is no room for doubt, but that they breed in any place in sufficient numbers to enable the natives to collect the cocoons for sale has yet to be proved.

The native weavers in all the principal textile centers of India such as Calcutta, Benares, Hyderabad, Madras and Dacca, prize Muga silk very highly for purposes of effect threads and borders in broadsilks made of tussah and mulberry silk, as well as in fabrics woven from other fibers. The reason for this is that it has a very fine luster and a most beautiful golden yellow color, which unlike ordinary yellow silks, is quite fast to boiling. Yellow Italian, Cyprus or Japan silks will all boil white, but not so Muga; the yellow is part and parcel of the fiber itself and as will be seen later it will require considerable drastic treatment to remove that color from it.

It may be thought that this would tend to make the silk unpopular among the dyers, and this is true to a certain extent, but the color is in itself so fine that most of them are content to let it alone. Broadsilks woven of Muga without any admixture of other silks is very highly prized by the native Indian aristocracy, who may be said to know a good silk when they see it.

The quantity that is produced annually is not very large; it is in the neighborhood of 145,000-pound of reeled net silk and about a quarter of a million pounds of waste, which has its value for the spinning of schappe.

Three Worm Species

There are at least three species of worms from which Muga silk may be obtained; these belong to the genus *Antheraca;* the most important member of the group is *A. assamensis*, the others are *A. frithii* and *A. roylei;* it is not definitely known whether the one called *A. andamanensis*, which is found growing in the Andaman Islands, is really a distinct species or only a variety of one of the others. It is very doubtful which of these kinds produces the finest grades of silk, owing to the great confusion that exists between the native names for moths and fabrics in different places, and also the rarity of finding a consignment of cocoons free from admixture of all or any of the species known. The whole matter has therefore become extremely involved, and it is not easy to come to any conclusion. Many experts, both sericulturalists and entomologists, have applied themselves to the study of the subject and have left it in a worse muddle as may be gathered from a statement of J. Henry Watson's, in which he notes that Cotes, the author of the "Wild Silk Insects of India," shows a plate on which the male moth and caterpiller of one species and the female moth and cocoon of another are described as belonging to the same species. With experts disagreeing in this way it is easy to understand that the reading of half a score of descriptions and official reports on the subject leaves the reader in a more confused condition than before.

Actually this scientific knowledge of the family history of the Muga moth is of minor importance compared with the interest aroused by knowing the method of producing its silk and supplying it to the markets of the world; although the silk weavers of the United States have not hitherto made any special efforts to buy up all the available Muga silk, there is no reason why, in view of the high price of mulberry silk, they should not take some notice of this "poor relation."

The feeding of Muga worms does not present quite so many difficulties as does *Bombyx mori*, for there are several plants upon which it can subsist and these grow plentifully in the jungles. There are several trees belonging to the Nat. Ord. *Laurenaceae*, which includes cassia, camphor, cinnamon, and many other plants, and also several in the magnolia family. As the natives who are engaged in the production of Muga silk have received no detailed instruction in the science of sericulture, this multiform food-supply is a matter of great advantage, for if one kind fails, there is sure to be one of the others at hand with which to carry on. The most popular food-plant, because it is found more frequently, is the tree called "Huala" and next come the "Soom" tree (*Machilus odoratissima*). Either of them is used very freely, and in many cases the young worms are fed on the first of these and transferred to the other when about half grown.

The general details of Muga culture are quite different to those of *Bombyx mori* and they supply a very good insight into the primitive working methods adopted by the natives without the assistance of the Government.

Cultivation of the Worms

After the moths have mated, a process which occupies about twenty-four hours for complete fertilization, the female is placed upon a bunch of huala leaves hung in a shed, which may either be devoted to the purpose of hatching, or be part of the dwelling, depending upon the importance of the silk crop to the family working it. As soon as the worms begin to hatch out the bunch of leaves upon which the seed is laid is carried to a huala tree and hung in its branches; as fast as the insects emerge from the eggs they crawl up the tree and begin to devour the leaves. In due course, all the leaves are eaten and a three-cornered grass mat is hung up high in the devastated tree and the starving worms creep on to it. It is then taken to another ree, where the process is repeated as required. When the worms have attrained their full growth and are preparing to spin, they stop eating and crawl down the trunk of the tree to the ground. The watchful children report that and the sleepy worms are garnered up, to be placed in a bunch of leaves on a tray where they may spin the cocoons.

There are no less than five hatchings in the course of a year; the cocoons are harvested in November, March, May, July and September. The fall crop is the biggest, and it will be seen that the care of a big family of worms does not leave the farmer or his household very much time to spare; as it is the work is not done satisfactory, there is an enormous amount of wasted effort on the part of all concerned. The food trees are tall and therefore inconvenient; each one will support a group of from ten to fifteen hundred of worms according to the age of the worms and the size of the tree. The yield obtained is distressingly small: one fertilized female will deposit an average of two hundred and fifty eggs and of the number that hatch out only one hundred get to the state of being half grown when they are transferred to Soom trees for feeding, and of the number that are so transferred only from twenty to twenty-five, very rarely thirty, spin cocoons. Below is a brief tabulated statement which gives a rough idea of the advantages to be gained, in number only, of the orderly and well thought out rules for the raising of mulberry silk as compared with the haphazard and irresponsible methods of cultivating Muga:

	Muga	Mulberry
Eggs per female moth	250	300
Worms reaching half growth....	100	240
Cocoons	30 or less	200

Despite the watchfulness of the children, many worms get away when they crawl down the trunk of the tree to spin, but this does not account for so many as are lost through disease, for the semi-wild Muga worm is susceptible to all those same diseases which many years ago devastated the silk crops of Europe, and which the great French chemist, Pasteur, spent many successful years in studying and combating; but the poor untutored Indian native silk raiser has not the advantages of this teaching. *Flacherie*, a disease which has been aptly described as being an acute form of dyspepsia, is rampant, while both *Pebrine* and *Grasserie* claim a large total of victims.

Being bred in the open air, the Muga silkworm is forced to face many other dangers besides those of diseases, and among the most prominent of these are monkeys, bats, birds, wasps and ants, all of which find a dainty food ready collected for their use, and despite scarecrows and clappers do an enormous amount of damage. It is only when one has actually seen the huge numbers of bats, for instance, that it is possible to realize how easily a crop of worms may be cleared from the food-plants. There is an occasion that will always live in the writer's memory of noting a cluster of trees one afternoon on which the foliage appeared to be oddly different from any others. One of the native guides sent on to report on the matter made his way through the jungle to the little clearing and there with a heavy club he belabored the trunks of these trees and shouted. Instantly a thick cloud of huge bats flew out of branches, millions of them as big as cats with wings, a perfectly incredible number that formed a thick black haze round the trees. As we went away we saw them slowly settling back again and before long the trees had assumed their strange bunchy appearance once more.

In addition to the enemies already enumerated, there are parasitic flies which lay their eggs in the bodies of the worms and so destroy them; against such as these the natives are also powerless.

An Indian investigator, M. Basu, to whose careful studies much of the available information on Muga silk is due, has found that when the silk-raisers have an excess of female moths they take the opportunity of in-

(*Continued on page* 605)

Some Chemical and Physical Properties of Anthracene Blue

Soluble Anthracene Blues—Two Anthracene Blues Compared—Fastness and Other Properties

By RAYMOND L. DREW

HEXAHYDROXY-ANTHRAQUINONE, Anthracene Blue WR, is a dark-brown powder giving in concentrated sulphuric acid a blue color. It is insoluble in water, but dissolves in the presence of sodium hydroxide to a pure blue solution from which the dye may be precipitated by the addition of acid, or salted out by the addition of sufficient salt. The salted-out material may be filtered off and dried, and, being a sodium salt, is quite soluble in cold water.

The water insoluble Anthracene Blue is soluble, to a certain extent, in sulphuric acid—5% to 10% strength—to a red color, but is more readily soluble in glacial acetic acid, the color of the solution being red also. From this solution the blue will crystallize as large and well-formed needles, and dilution of either of the acid solutions causes the separation of the color.

On account of the very insoluble form that the blue acquires when dried and the weakening that the heating necessary to dry is liable to cause, it inhabited the market, up to the time of the World War, in the form of a 20% paste, but since that time, due to improved methods of drying, the paste has been almost entirely replaced by the soluble dry types.

Soluble Anthracene Blues

The soluble Anthracene Blues cover quite a range of varying degrees of solubility in water, usually depending on the number of sulphonic acid groups present. Occasionally, though, the solution results from the formation of a sodium salt. The disulphonic acid compound is soluble in cold water and for separation must be salted out. Incidentally, this compound has received several trade names, such as Acid Alizarin Blue BB, Alizarin Cyanine WRS, and Anthracene Blue SWX. The monosulphonic acid is insoluble enough in cold water to separate from solution almost completely at temperatures below 20° C. Treatment with alkali to the formation of the sodium salt renders this product soluble.

It is interesting to note that generally the fastness of the shade to washing decreases as the number of sulphonic acid groups present in the molecule increases.

The apparent solubility of the blue as it is received in the powder form is often deceiving and should not be considered as a criterion of the quality of the dye. Some of the brightest and fastest shades, while apparently insoluble in cold water, dye perfectly, passing into solution in the presence of the chrome mordanted wool and acetic acid, when the dyeing temperature is reached.

The old 20% paste, while apparently soluble, was merely so because of the fine state of division of the particles, making possible what might be called a colloidal solution. If allowed, however, to stand a considerable length of time the color would settle out of the solution as a fine sediment.

Anthracene Blue WR and WG Compared

Anthracene Blue WG, which is often erroneously called WR in trade, is not soluble in cold water but passes into solution on long boiling. This type of blue is not quite as fast to light as the WR and is somewhat greener in shade on chrome mordanted wool. The greatest difference in shade between these two blues may be seen in the dyeings on alumina mordanted wool; the WR being almost a violet color while the WG is pure blue.

During the regular dyeing of chrome mordanted wool with Anthracene Blue WR a precipitate is formed when the acetic acid is added, while in the case of the WG Blue the bath remains clear, exhibiting a marked difference between the two blues. While the WG Blue begins at the first to dye the wool the regular Anthracene Blue shade, the WR causes the wool to become a dark brown color at first, later developing into the final blue shade. After the bath reaches the boil these blues become very level dyers since from then until completion little more than a mere development of the color takes place. Before the boil is attained, though, care must be taken so as to avoid uneven dyeing.

Four per cent dyeings of these blues on chrome mordanted wool make excellent fadeproof blue serge, as these colors are extremely fast to light. Aside from being very level dyers they possess excellent penetrating properties.

Much of the Anthracene Blue upon the market is a mixture of WR and WG, sometimes treated to make soluble in cold water and sometimes left in its poorly soluble form. A cursory glance at heavy dyeings of this blue and the genuine WR may not be sufficient to differentiate between them, but in weak dyeings a slight dulness in the mixture can be plainly seen.

The mixture gives in concentrated sulphuric acid the characteristic color of the WG Blue, that is, red brown, unless the manufacturer has added something to cause the blue sulphuric reaction of the true WR Blue. While this is rarely done, to the knowledge of the writer, it is indeed possible and the chemist should be on the lookout for it.

As the WG Blue contains nitrogen its presence in a mixture may be confirmed by the smell of ammonia when the color is boiled with strong sodium hydroxide solution. Of course, no ammonia is given off from the true Anthracene Blue WR.

Anthracene Blues are precipitated completely, forming insoluble metallic salts, with salts of copper, zinc, calcium, silver and many other metals. These precipitates are of tinctorial value.

Practical Hints on the Production of Bright Colors on Textile Fabrics

Part XL

Two or More Color Contrast Effects—Three Contrasting Colors—Colors of Different Intensity—A Special One-Color Ombree Effect

By RAFFAELE SANSONE

THE number of grounds in printed goods having three and more color contrast effects is large, for these can be of very different nature, and can be varied in accordance with the construction of the goods, the nature of the designs printed, and other factors. They can be produced through:

1. Three colors of which two contrast with a single darker or lighter color.
2. Three colors all contrasting with one another.
3. One of the colors being printed differently from the other two.
4. Regulating the nature of the design for making appear more one or the other color.
5. Using colors of different intensities.
6. Using two different medium or dark colors with two other lighter colors that contrast with the first.

With the first class of grounds the two contrasting colors can be a ligher and medium shade, a medium and dark shade and a light and dark shade of a single color, and the base color must differ very markedly from this. Thus a yellow base color is printed in the form of small circles or rings, and covered by thin bands of lines, one lot of which is of a light green and the other of a medium green; a red base color formed by zig-zag lines of different thickness is traversed by medium green inclined lines running from left to right; a violet base color in the form of spiral lines is traversed by narrow vertical lines, a part of which is of a medium pink and a part of a dark pink; very thin black inclined lines traversing from right to left and from left to right the width of the goods are contrasted with bands of thin lines of light and medium red, etc.

Further changes in the appearance are obtained by varying further the effects in the *base* color, or in the two colors that contrast with this, causing the two contrasting colors to appear close together or separated, using a greater quantity of the one or of the other, using a very lighter gradation of one of such contrasting colors for shading the same color in a much darker shade, using the contrasting colors only for a light shading, or for a light shading and a stripe effect, using the ground or base color as a shading means.

Three Contrasting Colors

When all the three colors contrast very fine effects are produced by printing, for instance, a medium blue in the form of very fine lines, and placing above this bands of undulating lines, arranged so that one lot is yellow and the other green. A certain variety is introduced by the width of the fine blue lines, or of the undulated bands above these; the placing of the two differently colored bands one immediately after the other, or at a short or greater distance apart; the adoption of thicker lines in one of the contrasting or covering colors; the adoption of zig-zag lines instead of spiral lines; the alternation of spiral or zig-zag lines with straight parallel lines, etc.

The lines of the lighter or darker base color can be placed across the weft, while the contrasting colors can both be run down the length of the goods, or only one in this way and the other across the weft. The arrangement permits a contrast of quite special nature that can be varied more or less in accordance with the distance of the lines from each other, their thickness, the presence of more lines, the adoption of continuous lines or of lines broken off at regulated or irregular spaces, the alteration of a thick line with a thiner, etc. A very fine effect can be produced in the above case by printing across the weft with a paste containing Rhodamine 6G, pink stripes placed at an interval of one-eighth inch from one another, and forming bands one-half inch apart; and crossing these by bands of straight thin lines obtained with a paste containing Brilliant Green, and placed one inch apart from each other. In the white spaces thus left are printed closely placed bright orange lines, which leave a white line on both sides.

In the cases where one of the colors is printed different from the others, the grounds possible are also numerous. The base color can be applied as triangles forming a sort of stripe down the length of the fabric, and the contrasting colors can be used for shading, or for producing lined stripes on either side of the triangles. Besides this, one of the contrasting colors can be printed different from the other and from the base color, that can be composed of bands of thin lines, where one of the contrasting colors forms ondulations through two thin lines running backwards and forwards, while the other contrasting color produces intermediate stripes with vertical thin and thick horizontal, ondulated or inclined lines. Another interesting effect could be produced by printing stripes with the base color containing small white squares, circles, rectangles or triangles placed at regular intervals, one of the contrasting colors producing centers in these and the other simply producing

lines at the two sides of the stripes. In this way a four-color pattern results.

With Colors of Different Intensity

With some grounds, the nature of the design is specially varied to emphasize one or the other color. Thus the fabric is completely covered with thin inclined lines containing the base color, and on this are introduced light lines, or designs of the two contrasting colors. In other articles the bleached cotton cloth is furnished with light stripes of the base color, shaded by thin lines of one of the contrasting colors, the other producing stripes of deeper color traversing the material in the same direction as in the first case, or in the opposite direction. By employing three colors of different intensity, bright grounds of some attraction can also be produced. In this instance, a dark base color (black, dark blue, dark green, dark brown, etc.) is employed for producing very thin vertical lines down the fabric, which leave small white squares, rectangles, triangles or circles, in which one of the contrasting colors produces very narrow, close lines of a light color, and the other circles or other effects in a medium color.

With another class of grounds, where four colors are employed, two of these serve as base products, and the other two for shading them, producing compound effects of great beauty that easily blend together, forming a unique design. Very satisfactory results are obtained by printing series of very thin medium blue lines side by side with other series of bright pink lines, of slightly greated width, and printing on the first small yellow dots and on the other violet dots; the pattern being varied by placing the differently colored stripes close together, at a slight or greater distance apart, or by placing them in pairs; or one series of lines across the weft and the other along the length of the material. By undulating the thin lines in the stripes, composing these of triangles, squares, rectangles, etc., or using thinner and heavier lines in both series of stripes or in only one and a difference in the spacing or other special arrangements, further variety is obtained.

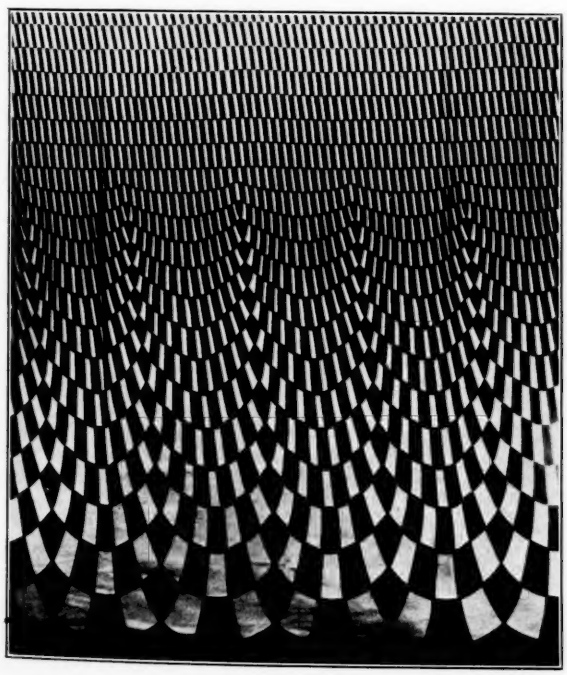


Fig. 1

The Ombree Effects

Very interesting ombree effects are produced by printing on bleached mercerized cotton goods or on goods with a bright rayon front. The development made in this fine class of goods is, however, still small in comparison with what could be achieved with more study. Ombree effects can be obtained at present: With one only color; with two colors used successively; two colors used simultaneously one above the other; differently constructed stripes; series of thin lines producing stripes each of a different gradation of shade; stripes and lines, or with three or more colors.

The first ombree effects were printed with only one color, by starting with a stripe in the lightest shade and following with a second stripe of equal size, but with a slightly deeper tinge of the same color, and with other similar stripes one after the other and always deeper until reaching the strongest tone that can be obtained with the dyestuff. In this way very fine effects were produced across the width or along the length of the cotton fabrics, which have been often mercerized to obtain a luster.

Later a certain change was made by varying the size of the stripes employed in each case, so that the goods no longer possessed the harmony of the above ombree, but had portions where this was slightly interrupted, or altered. Besides this, a white space was sometimes left between each stripe, which rendered the difference in shade more marked; the stripes where composed of thin lines running horizontally down the length of the goods, or vertically across the width, or with inclined lines.

The space occupied by the ombree effect was also given the attention of the printer, who produced the stripes with some articles over a certain number of inches of cloth, while with others they were limited to a comparatively small space. With a special class of mercerized goods a double ombree was produced, by following a full effect with thin stripes, by another produced with thick stripes, always in only one color. Another series of patterns had the ombree crossing the fabric in two directions, so that it met in certain points, producing a compound pattern that could be altered by using the ombrees close together in one direction and at a certain distance apart in the other; by inclining the ombrees from right to left in one direction and from left to right in the other; by using very long triangular stripes, one-

half of the points of which at one end of the wefts and the second half at the other end, etc.

A Special One-Color Ombree Effect

Fig. 1 shows an interesting and out of the ordinary article largely employed for summer dresses, where the ombree effect is visible in the full height of the piece. This is produced with a very large number of narrow vertical lines forming stripes down the warps, which remain straight until reaching a certain point in the fabric, where the pattern is varied and becomes darker in color, a first slight ondulation being introduced. The first lot of such lines is very thin, and is followed by other lots that increase gradually in thickness and size, becoming rectangles that assume later the most different forms until some of them are transformed into trapezes that disappear in a heavy bottom stripe on the selvedge of the piece. The distance between the light upper lines and the darkly colored bottom stripe can be in some articles as much as two yards.

The principal difficulty in the production of the above style is the preparation of the engraved rollers, as these must have a very large circumference. The single color required for the production of the whole design offers no difficulty. It can be a basic dyestuff, a sulphur dyestuff, an alizarine color and even a vat color. For obtaining a very bright effect, the color paste given below can be used to advantage for the darkest shade, and after convenient dilution with an acetic acid starch paste for the other gradations ending in the lightest:

10 parts of a convenient brand of Safranine are dissolved in
330 parts of water containing
100 parts of acetic acid at 6° Be.; and the resulting solution is incorporated into
500 parts of a convenient thickening prepared as indicated below, and when the mixture has cooled to 20 to 30° C. are added
60 parts of a solution with 1 part of tannin in 1 part of acetic acid.

The thickening required in the above case is prepared with:

1150 parts of wheat starch.
7050 parts of water,
1000 parts of a 6½% gum dragon mucilage and
800 parts of acetic acid.

The cotton goods are printed with the above paste, and after drying in the usual way in the hot flue, they are entered in the small Mather and Platt and steamed there for thirty minutes with a pressure of one-half atmosphere. After the steaming the goods are passed through a bath containing 5 to 10 parts of tartar emetic for every thousand parts of water, washing thoroughly and drying. After this a simple passage between the cotton bowls of a calender yields a very fine fabric that can be offered on the market quite cheaply.

(To be continued)

The Sandoz Chemical Works, Basle, Switzerland

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THE Basle plant of the Sandoz Chemical Works, Inc., is interesting to the visitor from several standpoints, not the least of which is the immunization process. Through the courtesy of Dr. W. C. Kaesche, of the New York office, and Geo. H. Wagner, director at Basle, I visited all parts of this plant and saw the manufacture of almost every class of dyestuff.

Among the many interesting men at this plant is Dr. Giovanni Tagliani, who is known for his work on the immunization process for cotton. After spending considerable time investigating this process and product, I believe that it has a promising future, and that the textile industry has failed to realize just how many possibilities this process offers for the piece dyeing of two or many more color effects on all cotton materials.

Immunized Cotton

Of course, we have all heard considerable comment regarding the process and product, but very few samples have appeared in the Southern States. I was surprised at the variety and beauty of the samples shown me at Basle; and what is most important, these were plant samples and not laboratory products. I was allowed to inspect the immunization plant, as well as all parts of the dyestuffs plants, and saw the handling of the yarn in bulk in all parts of the process.

Immunized cotton is not applicable for every purpose, no more than is any other new product, but it does offer many advantages for certain types of work where it is desired to dye two colors, in the piece, and in a single bath. The principal objections I have heard to the product in America have been price and low tensile strength. The samples I saw were of the same strength after treatment as before, for all practical purposes, and as far as price is concerned, I believe that for certain work and particularly where small colored effects are desired, the price of the yarn will not be found to be prohibitive.

As many of you probably know, immunized cotton is a cellulose ester, as is also acetate silk with which it has some properties in common. For example, it is dyed by the same dyestuffs that dye acetate silk, such as the dispersol type of dyestuffs, and in the same way resists the direct cotton dyes. However, in certain other respects it differs very materially from acetate silk. This is as would be expected due to the great difference in the manufacturing process. While the immunized cotton is treated as and remains in the same form (fiber) through the process, the cellulose acetate is dissolved in a solvent and the filaments reformed by drying on precipitation. Immunized cotton withstands boiling water and strong

caustic solutions, such as in mercerizing, but does not withstand more dilute alkali as well as when it is in the concentrated state.

The process of immunization is not a simple one, but those interested in the product need have no worries on this point. The product is available in America where the Munitex Corporation has erected a plant to immunize both natural (white) and dyed cotton yarns. The immunization of dyed yarn is a particularly interesting phase of the subject in that the cotton can be dyed with selected direct cotton dyestuffs and then immunized. When this dyed and immunized cotton is woven into the piece combined with white cotton, it is claimed that the white cotton in the piece can then be dyed any desired shade by direct cotton dyes and that these dyes will not stain the previously dyed and immunized yarns in the piece. As might be expected, due to its water resistance, the direct colors on immunized cotton are said to be somewhat faster to washing, etc., than on normal cotton.

The direct dyes for acetate silk were also very interesting and I had the pleasure of seeing these printed on Celanese with excellent results.

Another interesting product demonstrated to me is used as a wetting-out agent in the mercerization bath on cotton. This is a phenol product, soluble in the caustic soda mercerizing bath, and is intended to improve the wetting-out of the raw cotton in the caustic bath. Anything of this nature should prove of value in plants where it is desired to speed up the mercerization process

(*This is the third of a series of brief descriptions of European dye plants and their processes. The fourth will appear in an early issue.*)

LEEDS TEXTILE DIVISION ENLARGED

All the machinery formerly in use in the textile division of Leeds University will be scrapped to make room for new equipment that will be installed in a large and important extension comprising several new buildings. Several textile machinists of Great Britain have contributed toward the installations in this addition to the noted university's textile department. The latest machinery for wool and worsted manufacture will be used to equip the new section, and reorganization and research work will be planned for the coming season. Accommodation is being provided for a silk research association to be housed in the university.

The new extension will be opened for use October 11 and the Worshipful Master of the Clothworkers' Guild will preside at the ceremony.

Following the return of Robert Wyder, president of the Textile Dyeing Co. of America, Inc., Hawthorne, N. J., from his recent trip to Europe, plans have been going forward for the installation of a complete modern silk printing plant equipped with the most approved printing machine, accessory installations and a fully equipped designing and engraving department.

The Problem of Dye Fastness

Effects of Perspiration

Chemical Constitution of Perspiration Not Defined—The Line of Investigation—No Test Yet Formulated.

THE effects of perspiration upon dye fastness in various types of fabric are being investigated under the auspices of the Society of Dyers and Colourists by the British Research Association for the Woollen and Worsteds Industries, at Torridon.

Professor McSwiney, of the medical department of the University of Leeds, has undertaken to supervise this research work, which will be carried on by C. C. N. Vass, B.Sc., in order to obtain definite information on the constitution of perspiration before anything is done to prescribe tests for fastness, etc.

Dr. S. G. Barker, director of research at Torridon, Headingley, Leeds (the headquarters of the British Research Association for the Woollen and Worsted Industries), in an interview, said that after preliminary investigation it was found that there was no definite knowledge of the chemical constitution of perspiration, neither was there any knowledge regarding the action of the atmosphere on perspiration after it had exuded from the body. Further, it was unknown as to whether a normal person exuded alkaline or acid perspiration, many cases of both types having been found. People of a tuberculosis nature, those engaged in mines or in specific occupations, exuded perspiration which was quite different in character from that of other persons.

The Line of Investigation

The first experiment was to determine what was the average normal perspiration. This would be followed up with an investigation of normal and abnormal perspiration produced under a variety of conditions, such as after excessive manual labor, fatigue, or after sports, or in artificially reproduced atmospheres, such as would be produced at the Harrogate Baths or in Turkish baths.

This, continued Dr. Barker, would be extended to people suffering from a variety of complaints, such as rheumatism, etc., where perspiration had a very definite meaning. The work had been partially completed in the medical faculty, partially in the Harrogate Baths, and by means of perspiration tests on persons wearing rubber suits in the association's specially controlled humidity room, whereby both temperature and humidity concerning the patients could be automatically maintained constantly for a definite period.

"The result of this work," he continued, "will be, we hope, that we shall be able to place the manufacturer in a position to give a very definite test to his fabrics, so that the hosiery trade more particularly will know the precise effect of perspiration not only on the dyestuff, but on the fabric itself."

One point had emerged already. There was a very

definite change in the constitution of perspiration during 20 hours after it had been exuded, and it was possible that this change might afford the secret of the attack on both textile fabrics and dyestuff itself. The Americans had acknowledged in a report the absence of adequate information on the constitution of perspiration.

"We are not going to prescribe a test before we know what perspiration is; first of all we have to know what it is, then we can make a test for it," concluded Dr. Barker.—*The Textile Argus.*

The Distinction Between Process-Marks and Service-Marks

Distinguishing Between Mill Dyeing and Retail Garment Dyeing—The Test Case That Brought Out New Issues—The Questioning of Origin and Ownership

By Waldon Fawcett

RECENT issuance, at the U. S. Patent Office, of an ultimatum denying registration to the trade marks of retail establishments engaged in dyeing and cleaning operations does not mean that recognition is to be withheld from converters or finishers who are engaged in dyeing on a large scale as an incident to manufacture. It is not strange, however, that some mystification has resulted in the dyeing industry and kindred fields. To many laymen the distinction between the two classes of dyers' marks must appear a fine one. Especially since Federal authority has repeatedly proclaimed that the size of a business has no bearing upon the right of trade-mark possession.

That this double standard of trade-mark monopolies should thus have been set up is due to the gradual unfolding at Washington of a policy which separates dyers' marks into service-marks, on the one hand, and process-marks or conversion-marks on the other. Lacking hard and fast rules, the best means of classifying the different types of clues to the dyers' responsibility is to be found in the several test cases which have, at comparatively recent dates, engaged the attention of Federal tribunals.

The test which occasioned misgivings these past few months and brought to Washington many letters of inquiry from the dye field is known, in legal circles, as the Gregg case. The firm of Gregg & Company, located in Indianapolis and with a business extending into adjoining States, applied for the registration of a mark in use on labels attached to goods that had been dyed or cleaned. The Gregg firm is engaged in dyeing fabrics and furs, as well as renovating and repairing this class of commodities, and desired to entrench, against imitation or infringement, the badge of its business.

From the outset, the administrators of the Federal clearing house for trade marks demurred at registering the Gregg mark. They took the position that a company engaged, as is the Indiana concern, in dyeing and reconditioning garments, etc., is a service corporation and does not give trade-mark use to any symbol it may adopt. More specifically, so the argument ran, the mark of such a commercial user of dyestuffs does not indicate either origin or ownership of the goods, as required by law. Furthermore, in this official view the operation of dyeing is not equivalent to the manufacture or distribution of a vendible commodity. To the plea of Gregg that a dyer and cleaner is in the same category as retail dealers in various lines, Washington remained cold. It was pointed out that while it is true that in some instances dealers' marks appear on goods which they handle or which are manufactured for them, in such cases the dealer assumed the responsibility or is at any rate the owner of the goods.

The crux of the objection raised by the Government was that where no sale or change of ownership is contemplated a mere *service* on the article is no basis for a trade mark.

The Broader Meaning of "Origin"

Reluctant to take "No" for an answer, Gregg & Son carried their case on appeal from one tribunal to another. It was urged that, thanks to the growth of operations on consignment, etc., there have come into existence new and broader meanings for "origin" and "ownership" as applied to trade marks. Particularly has it come to pass that "origin" may be "supplemental origin" where something, to add value, is added to a commodity, as distinguished from a service which resulted in transfer of ownership. What Gregg relied upon chiefly to win recognition for his commercial thumbprint was the willingness of the Patent Office to accept marks of kindred character, i. e. the marks of dyers or mercerizers who supply intermediary service in the textile industry.

In the end the Gregg persistence lead to the Court of Appeals at Washington. But only to confirm the rejections at the Patent Office. The Appeals Court, which is the tribunal of last resort for review of Patent Office decisions, pointed out that to warrant the registration of a trade mark it must appear that the mark has been used on an article of commerce and that it has been used in commerce. The mark must likewise possess a distinctive identifying characteristic of the article to which it is affixed. In the current instance, the Gregg firm did not, in the estimation of the court, meet the requirements. Commented the court: "The mark is not attached to vendible article nor does the appellant (dyer) occupy such a relation to the goods to which the mark is attached as to entitle it to sell or dispose of same. The company does not rise to the dignity of a dealer. Neither is it a producer of the goods since it possesses neither origination or ownership."

Officials at the Patent Office say that there is nothing inconsistent between this rejection of the service-marks of dyers and cleaners, operating in a retail relation, and the acceptance of the process-marks of finishers and converters who operate on a whole scale, making a distinct

step in fabrication. Even though such an operator neither buys nor sells the goods he possesses, these goods rank as goods in commerce and will support the trade mark of one who has had a material part in the transformation from raw material to finished product.

In substance, the Federal censors acknowledge that for this type of commercial dyer a trade mark performs the function that it is designed to perform, i. e. gives hostage for satisfactory performance and the integrity of material. In short a process-mark in the dyeing industry is applied by the processer as a guarantee of the quality of the dye and the quality of the dyeing as well as the quality of the fabric selected for dyeing.

Ownership of Goods as a Factor

This position of the supervisory powers at Washington has been made clear on a number of occasions but most comprehensively perhaps when question was raised a few years ago as to the right of the Bradford Dyers' Association to register in the United States the mark which it stamps upon goods dyed by it. This test case turned on the issue of ownership of goods. One school of expert opinion held that even though the dyeing was done on a wholesale scale as an incident of manufacture, the technicality of non-ownership of goods was sufficient to deprive the finisher of the right to a separate mark. In his final decision the Commissioner of Patents admitted that a delicate question was involved but he said that the mark of a processer is not in the same position as the mark of a service organization engaged in dyeing individual items for retail customers. Investigation showed that it is customary in Great Britain to grant registration to process marks in the textile industries—say the marks of bleachers—and accordingly it was decided to adopt this same policy in the United States. As the Commissioner remarked in vindicating the dyers' process-mark as a registrable means of identication: "It is certainly of benefit to the public to know that its goods are dyed by a proper party."

CONTRASTS IN TEXTILE ARTS AT SOUTHERN EXPOSITION

What mechanical ingenuity has accomplished in advancing the arts of textile manufacturing will be dramatically brought to the attention of visitors to the Southern Textile Exposition, which opens in Greenville, S. C., October 15. W. G. Sirrine, president of Textile Hall, where the exposition is to be held, has collected a veritable museum of old spinning wheels and hand looms, antiquated carders and samples of fabrics made in Egypt of the Pharoahs four thousand years ago. These will be exhibited in the mezzanine of the exhibition hall. Surrounding them will be the visual evidence of the advances that textile manufacture has made in the last few years, where the very latest mill machinery and equipment will be displayed, the last word in the machinery builder's art.

The number of exhibitors at the Southern Textile Exposition has grown to 180, and the variety of machinery in operation during the week of the show will include everything from the opening of the cotton bale to the final finishing of the fabric.

The program for the week will be developed from the following daily schedule of events: Monday, October 15, opening of the exposition at 10 a. m.; Tuesday, Master Mechanic's Day; Wednesday, Textile Section of the American Society of Mechanical Engineers meeting; Red Cross Cotton Carnival Ball in evening; Thursday, "Arkwrights" Day; Friday, Southern Textile Association Day; Saturday, Operatives' Day.

The Market for Dyes in India

By Consul W. Keblinger, Bombay

Special Circular of the Department of Commerce

INDIA is an important market for aniline dyes and with the increasing purchasing power of the people the business is certain to show large gains from year to year. A large portion of all of the aniline dyes imported into India comes through the port of Bombay, which is the chief distributing center for the trade. Before the war Germany had almost a monopoly of the trade, but following the efforts of Great Britain, France, Belgium, and the United States to create aniline dye industries to replace the German supply stopped by the war, India was forced to depend on these countries for its dyes. This condition continued for some time after the conclusion of the war, but once Germany reentered the market it made giant strides to recover its former trade and has each year increased its percentage of the whole business.

The total imports from Germany for 1927, which includes those coming from the Netherlands, represent practically 70 per cent of the total trade, with the United Kingdom second with 9.6 per cent and the United States third with 8.1 per cent. These total figures, however, include alizarine, which represents practically the total imports from the United Kingdom. If the aniline figures are taken separately Germany again leads with approximately 70 per cent (including imports from Netherlands), with the United States second with 11.1 per cent and the United Kingdom falling behind Italy and Switzerland. Actual imports shown as coming from Italy may be considered as having originated in Switzerland.

The principal American importer brings in its product in concentrated quantities which would ordinarily add about 25 per cent to the total number of pounds imported from the United States. Imports from "other countries" may be considered for the most part as transfers of stock from China and Japan and numerous other places, but

which actually originated in the countries shown on the table of imports.

The alizarine business is done almost wholly by Germany and Great Britain, with Germany taking approximately 70 per cent, the United Kingdom 23.9 per cent and the United States and Switzerland taking negligible amounts.

The total annual consumption of dyes in India, based on the import figures running over a period of years, may be said to be approximately 15,000,000 pounds.

Two Markets in India—The "Bazaar" Trade

There are two separate and distinct markets for aniline dyes in India; that is, the bazaar market and the mill trade. Aniline dyes are sold in every town and village throughout India, Burma, and Ceylon. They are marketed in 1 and ½ pound tins, although some sales are made in the larger markets in lots of 28, 56, and 112 pounds or even larger quantities. Such sales, however, are usually confined to local dye houses of some consequence.

There are certain well recognized color selling districts, the most important of which are Adoni, Agra, Ahmedabad, Amritsar, Bangalore, Benares, Bombay, Karachi, Madras, Madura, Mangalore, Multan, Nagpur, Patna, Peshawar, Salem, Sholapur, Tinnevelly, and Tirapur. To these centers come the purchasers from the smaller centers, who in turn sell to the outlying villages. The smallest dealer of all will sell out of open tins in extremely small quantities, charging perhaps an anna or two for a spoonful of dye.

Dyeing is done for the most part by local dyers in each village. These dyers are both Hindu and Mohammedans. It will be understood that in India certain trades are confined solely to certain sects or religions and among Hindus to certain castes. They may be divided roughly as follows:

(a) Khatris, who may be either low-caste Hindus or Mohammedans;

(b) Brahmakhsatri, who are high-caste Hindu dyers and weavers;

(c) Chippas. These may be either Hindus or Mohammedans and usually do coarse work. In Ahmedabad they do alizarine and aniline salt printing for the most part.

(d) Bhavsar. These are Gujerati Hindus who will dye indigo. No other Hindus will dye indigo as it is a belief that indigo dyers will never become the father of sons. Consequently indigo dyeing is chiefly done by Mohammedan Khatri dyers.

(e) Rangrej or Rangaris, who are Mohammedans who confine themselves to small fine work in turbans and saris, such as tie and dye work. A majority of the potty dyers in the small villages are of this type.

There is a certain amount of dyeing done in the household by women, but it is very likely that it would not amount to more than 5 per cent of the total.

There are many larger dyehouses in the principal dyeing centers which are more up to date in every way. Madura is noted for its alizarine dyeing and the process is peculiar to the place and similar results have never been obtained in any other part of the country. The special results that may be obtained in Madura may be attributed to the particular methods used and also to climatic conditions, due to the fact that the sun's rays are very intense for the greater part of the year. Specialization in various kinds of work is carried on in certain sections of the country, for instance in Sholapur, Bangalore, Nagpur, and in Cawnpore considerable indigo dyeing is carried on, although natural indigo has now almost entirely been superseded by synthetic. In Ahmedabad, Farrukhabad, Lucknow, and Benares hand block printing is done and in Jaipur, Jodhpur, and Jamnager tie dye work is done.

The colors sold in the bazaar trade are largely reductions, or weak colors, which are reduced in order that they may be sold at a price which will enable the small dyers to buy a pound or half-pound tin. However, the bazaar buyers in some sections are demanding more concentrated colors in larger containers in order to reduce the ultimate cost.

The Mill Trade

The mill trade of India is more or less confined to certain larger centers given in the order of their importance: Bombay, Ahmedabad, Cawnpore, Calcutta, Sholapur, Indore, Madras, Bangalore, Nagpur. There is also a number of mills of considerable importance scattered over other parts of the country.

Sulphur black, which has the greatest consumption in the mills, is consumed in large quantities in Bombay, Cawnpore, Magpur, Sholapur, and Indore. This is for the coarse cloth that is generally sold throughout India and also in Afghanistan, Baluchistan, Persia, Arabia, and Africa. The majority of the other colors used are direct cotton colors of moderate or fair fastness qualities. There is a growing tendency, however, toward fast colors, particularly for dhotie borders, and shirtings, where vat colors are in demand. This is particularly true in Ahmedabad, Bangalore, and Madura and to a certain extent in Cawnpore.

The dyeing machinery in many of the Indian mills is antiquated and wholly satisfactory results are not always obtainable. Some of the more progressive mills are installing modern dyeing equipment and the results have proved satisfactory in every way.

Many of the mills in India do not operate a dyeing department, manufacturing only grey and bleached cloth. Most of the mills, however, operate a dyeing department, although in Bombay a system of contract dyeing exists whereby the dyeing is let out to a contractor who does the dyeing on a price per yard basis.

The German manufacturers are able to offer the Indian market a complete range of colors. No manufacturer of any other country is able to do this at present. American manufacturers offer a very complete range with the exception of napthol, a developed color patented by Chemische Fabrik Griesheim-Elektron, Frankfort-on-Main, Germany, and certain other specialized colors which, however, do not command an extended market in India. Vat colors are now being manufactured in the United States but they are not being offered in large quantities in India owing to the fact that the American demand is sufficiently large to absorb the present production and also because the price of vat colors as offered by the Swiss, British, and German is very low.

American manufacturers have not, heretofore, endeavored to sell alizarine in the Indian market, but since the beginning of the year it has been offered. The Swiss manufacturers are able to present quite a wide range of colors, with the exception of Sulphur Black and their napthol colors are not as satisfactory as the German. They participate in the alizarine trade only to a limited extent. British manufacturers are not offering a very wide range of colors in the Indian market, and while they manufacture almost all the types they are not inclined to accept the prices obtainable in the country at the present time. This is true of Sulphur Black in particular and to a lesser degree to congo and vat colors. French and Belgian dye imports are not regular and their range of colors is not very wide. Japanese imports are confined to one color, Methyl Violet, and even this has not been imported to any extent recently.

At present the bulk of the Sulphur Black business is being absorbed by the German manufacturers, but until the middle of last year the American manufacturers figured very largely in the trade and during the first part of the last year (1927) and part of 1926 they took at least 50 per cent of this business, if not more. In congo red the American manufacturers get at least 50 per cent of the business. In all other colors the market is divided and the participation in the dye trade may be said to be about as shown by the imports.

Trade Organizations in Indian Dye Market

The German manufacturers are represented in India by the Havero Trading Company, a Netherland corporation, the dye department of which is almost wholly run by the representatives of the German manufacturers. Previous to 1925 all the various German dye manufacturers operated independently in India, but in that year there was an amalgamation and it was decided to market their products in India through one selling organization. The Havero Trading Company maintains an extremely large and expensive organization in India which includes about 30 European officers, the majority of whom are stationed at the head office in Bombay. This company also maintains offices at Calcutta, Ahmedabad, Delhi, Karachi, and Madras, with resident inspectors also at Amritsar and Cawnpore. They market their colors through various Indian stockists, who receive exceedingly liberal terms.

These stockists, of whom there are sixteen in India, deposit cash with the Havero Trading Company, which is supposed to be equal to the amount of stock which they have on hand and on this deposit they are paid interest at the rate of 6 per cent per month. Goods ordered by these stockists are billed at current prices when they leave the warehouse of the company so that a check may be kept as to whether the stockists are drawing more than warranted by their deposits. Goods are kept on a consignment basis by the stockists until sold.

Retail sales prices are fixed by the Havero Trading Company from time to time and reports of sales are made daily by the stockists. In addition to a liberal commission some of the stockists are allowed establishment expenses, but this is not a general rule. The territory and stocks which each German stockist is permitted is extremely complicated and as a result of the amalgamation certain stockists are allowed to market only aniline dyes while others are allowed alizarine and indigo as well as aniline. The division of labels is complicated in the extreme and it seems inevitable that their scheme must be reorganized sooner or later. Apparently no stockist is allowed any definite territory for his exclusive exploitation and in the larger color centers five or six different German stockists will be found competing with each other.

From this a pernicious condition has arisen and as large commissions are given, each stockist in an effort to get as much business as possible will forego part of his commission. This has had the result of lowering all prices in the bazaar. In addition it has made the purchaser very independent, resulting in the extension of long credit terms or an extremely liberal discount and in some case both. It will be noted that owing to the system of the German organization the Havero Trading Company more or less loses control of the selling as soon as the goods pass into the hands of its stockists and that the regulation or the retail prices can only be nominal. The mill trade is sold directly by the Havero Trading Company.

American Manufacturers in India

There are three American manufacturers represented in India. One of them maintains its head office in India in Bombay and also a factory where tin-packed labeled goods for the bazaar are prepared. This company has two American officers in charge. Mill sales are effected directly by the company or through their agents in Calcutta. The bazaar trade is covered by distributors, of whom they have 25. Sales in the bazaar are made under the company's own labels and distributors are restricted to selling only under those labels. These distributors are allowed consignment stocks against security. All retail prices are regulated by the company and stocks and sales

are checked by the company's inspectors who visit not only the distributors, but also the outlying townships in each district in order to keep posted on conditions. When a distributor allows credit he does so on his own account. In order to effect a closer control this company has recently amalgamated its warehouse, factory, and office in one location.

Another American company is represented in India by one American officer in charge and sells directly to the mills and to Indian dealers, who pack under their own labels and market in the bazaar. This company maintains no bazaar organization for sales under its own labels and has no agents or distributors.

The third company represented in India sells directly to the mills and local dealers and under their own labels, having about 15 or 16 bazaar agents.

Swiss, British and French Representation

There are four Swiss manufacturers represented in India. The Society of Chemical Industry, of Basel, generally called Ciba or Society, is represented by an Italian firm, Tobasso Volterra. They sell directly to the mills, to local dealers and to the bazaar through their agents, under their own labels. They have seven or eight agents throughout India. The Sandoz Chemical Works of Basle, are represented in India by Shaw, Wallace & Co., who keep two European officers for their dye business. They sell directly to the mills and to local color dealers. They have no bazaar agents. The firm of Rohner is represented by Carsandas Tejpal & Co. and are important in that they sell a napthol somewhat similar to that manufactured by the Fabrik Griesheim Elektron of Frankfurt. The J. R. Geigy, S. R., Basle, is represented in India by Torleif Ahlsand, an agent who does a small import business in various articles. He sells directly to the mills and the local dealers.

The British manufacturers are represented by the British Dyestuff Corporation and L. B. Holliday & Co. The British Dyestuff Corporation is now a part of the Imperial Chemical Industry and is in charge of two English officers, who have their offices with Brunner Mond & Co., Ltd.). They sell directly to the mills, to local dealers, and the bazaar under their own labels. They are arranging for distributors. L. B. Holliday & Co. have recently decided to close their office in India and have appointed the Indian firm of B. Shivehand Jethalal & Co. to act for them.

The French manufacturers called Kuhlman are represented in India by K. H. Kabbur & Co., an Indian firm having an office in England and Bombay. They sell to the mills and to local dealers certain labeled goods, which have, however, but small demand.

The Japanese firm which has been heretofore mentioned as selling only one color is represented by Mitsui Bussan Kaisha.

Labels and Competition

Much attention is given by the dye importers to the design and character of the labels used on their tins. Certain types of dyes which have had large sales for many years are known to the illiterate user only by the label and is recognized by the trade as a great asset. Hundreds of labels are in use and are being constantly added to. There are frequent attempts to fraudulently copy well known labels and the owners of such labels are constantly on the lookout to detect and prosecute those pirating their designs.

The general condition of the dyestuff trade in India is unsatisfactory and dealers feel it should of necessity be recognized in the near future. The severe competition in prices of the past several years has had the effect of driving prices on bulk colors to a level where it is stated that the manufacturers cannot obtain a reasonable profit and if present conditions continue some manufacturers will either have to withdraw from the field or amalgamate. Their bazaar system of doing business is inefficient and the liberal commissions allowed have a very unsatisfactory effect on retail prices.

American Competition

American dye manufacturers have had to meet a stiff competition from the Germans and when the past experience of the Germans in the Indian market is considered and the fact that their labels were well known in every bazaar, American progress in India is noteworthy. It appears that the Germans are prepared to cut prices until all serious competition is removed. Whether the American manufacturers will permit themselves to be driven from the Indian dye market is doubtful, but it is unfortunate that in their contest against the Germans they are constantly competing with each other and it would be to their benefit to have a better understanding among themselves.

From time to time small Indian merchants obtain dyes through jobbers in New York which are placed in the bazaar trade. These dyes are usually inferior in quality and while they represent only a small portion of the trade they have the effect of upsetting prices for a time in particular districts.

Following the report of the Tariff Board and the efforts put forward by the mill owners to secure some form of protection for the cotton textile industry after the Government of India had refused to accept the Board's recommendations, a special concession was granted by the removal of duty on millstores, which included dyes. While this gave a small measure of relief to the mill owners it has not affected to any extent the importation of dyestuffs.

Harman Bleachery Company, Frankford, Pa., has awarded general contract to Claro Construction Company, Philadelphia, for two one-story additions, 60 x 160 feet, and 32 x 100 feet, estimated to cost about $65,000.

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

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SILAS BENT ON RESEARCH

WE often find more stimulating thought in the casual opinions of a layman on a scientific subject than in the heavy-worded discourse of a dozen scientists. One can nearly always guess what a scientist will say on a topic like research, for example, and what he does say is usually based on thorough knowledge of the subject. But rarely is it put over in a way that stimulates thought among laymen. The frank observations of an outsider, on the other hand, while lacking authority, are almost certain to be more direct and more refreshing. For the layman brings to a technical subject a clear, unbiased viewpoint; he sees only the broader aspects of the matter and his view is not walled in by the mossy rocks of scientific tradition nor by those conventions peculiar to the professions.

Scribner's Magazine for September carries an article, "Research—the Business Builder," by Silas Bent. The author is a journalist, better known for what he has written about newspapers than about scientific research. We can think of many scientists who would not be mentally stimulated by his article. Nevertheless, his message will stir the minds of a host of industrial chemists and probably put a few more wrinkles in the furrowed brow of an industry like the textile industry, where research is preached about continually. What Mr. Bent has written can be applied to any industry, but for our purpose we will keep *textile* research in mind while quoting him.

There is nothing startling in his statement that "All industrial research is the child of pure science, for it consists in the application of discoveries valueless (in dollars) when they were made." But this truth cannot be repeated too often, nor cried from the housetops too loudly. There are any number of men in our textile industry who seem to have no idea of the relation of "pure science" research to their laboratory work.

More of them will probably see this relation, however, if we call it *fundamental* research instead of "pure science" when we have a specific industry in mind. We must assume that this term means research that is fundamental with respect to a given product. It should deal with basic properties and revolve on basic theories concerning that product. Each industry has, or should have, its own fundamental research, and if the industry wants to be high-brow it can call such research "pure science," so far as its own products are concerned. A dyed-in-the-wool scientist might doubt the purity of it, but that should make no difference to the industry so long as some of its research is really *fundamental*.

But to return to the Scribner's article, the author clarifies his subject for most general readers by a reference to what Maurice Holland * calls "the cycle of research."

> First there is the discovery in pure science, which may never be converted into dividends; then there is the scientific application of the discovery, if it can be applied; then there is the invention of a device; then there is the employment of the device in industry; then there is a process of standardization; then there is mass production.

Clear as a chart this shows how fundamental research literally builds business for industry, for any industry. And Mr. Bent cites as an example the hard tussle for its life that radio gave the old-fashioned phonograph, and relates how

> Only by pitting Greek against Greek could the day be saved. Research workers created a new and much improved talking machine, capable of imitating the range and quality of the human voice and of whole orchestras in an unprecedented way, and the laboratory thus saved an industry which the laboratory had come near to destroying.

Has that last phrase a familiar ring to textile men? It certainly should have, for laboratories have recently saved a few things in this industry that the laboratory nearly destroyed. A certain type of rayon made the dye chemist ponder a while when first it appeared on the market, but the laboratory saved that day for the rayon industry!

This use of the laboratory by one industry against another, radio versus phonograph, is termed "the new competition," under which, to quote Silas Bent,

> . . . allied industries band together to capture markets from other trade associations—such as brickmakers from lumber dealers. . . . [This] means also a new co-operation. The co-operation is within the trade association, and manifests itself, for one thing, in research for the good of the whole industry.

*Director of engineering and industrial research, National Research Council.

The textile industry as a whole has no rival product to combat at present. It can paraphrase the slogan of the leather makers and say that "nothing takes the place of textiles." We almost said that its rivalry is confined to the competition within the industry, between silk and rayon, cotton and wool, and between North and South. But to say this is to overlook the severe competition between American textiles and imported. Can the laboratory help in that conflict? Every reader of this journal knows that it can. Moreover, it can help both competitors, so that eventually the competition may boil down to a bare-fisted battle between our textile research laboratories and those of Canada, Europe and China. Says Mr. Bent:

> . . . no tariff wall can be built high enough to keep out the goods of a country which excels sufficiently in the economies and superiorities which come from successful and ingenious scientific investigation. . . .

But to our mind, the real juice of this article in Scribner's is contained in the following paragraph:

> The newer industries, many of them founded on research (such as radio), have been the most eager in its development; it is only recently that the older industries, such as steel and textiles . . . have begun to see the laboratory's light.

There Mr. Bent comes right home to our own fireside. "The older industries . . . textiles . . . have begun to see the light." Let us fervently hope so. Is it not time? But let us be sure of what we mean by "the light." We do not believe that the writer quoted was referring to the isolated research being carried on in the laboratories of several large mills; all very commendable, to be sure, but it is not "the light," not the whole light, only a mere ray or two. For Silas Bent says further:

> . . . research men work nowadays in groups. There are times when more than one problem must be carried along simultaneously with others, progressing *pari passu* if the end is to be consummated. Thus a new technic has been evolved, whereby problems are divided and subdivided; their elements are assigned to individuals or to small coteries. . . .

His allusion to groups *may* be taken by some to mean a group of chemists working for one corporation; but if the group is truly to symbolize that "light" of scientific research which the textile industry has begun to see, it should be engaged on *fundamental* research and should represent the *entire* industry. The picture should show a group of chemists working in a laboratory supported not by one corporation but by the industry. Only in that way can we hope to come out ahead in "the new competition."

This is not reviving a dead issue. Not longer ago than last week the chairman of the National Research Council, Dr. Harrison E. Howe, addressed the American Chemical Society at Swampscott on the subject of research, and this among other things is what he said:

> Industries that are well organized and expect to continue in the future have a well-organized research system. The New England textile manufacturers should get a committee of industrial chemists to study the *fundamentals* and tell them what science can do for the industry.

No layman's opinion is that, but the shrewd verdict of a man who knows more than almost anyone else about scientific research.

Now, the value of organized research to which Dr. Howe alluded has long been appreciated by trades allied to the textile industry. The laundry and dry-cleaning industries, as our readers know, have established technical research on a co-operative basis, with their own institutes and with fellowships at Mellon and the Bureau of Standards. A letter from Laundry Age recently published in the Daily News Record declared that the laundry association "has spent more than $200,000 in textile research during the past fifteen years, more than was spent by the textile industries themselves." That is only slightly more than $13,300 per year. But their studies have not carried them into fundamentals. The laundry men have been studying textile processing to determine whether they or the mills should shoulder the blame for damage to fabrics in laundering. They have been raising a cry for better, more serviceable fabrics. They have tried to establish standard laundry practice. This is applied research. They have not engaged in basic research on textiles and dyes, because that is not their work. Obviously, the textile manufacturers should undertake the fundamental type.

Why? According to the "research cycle," any basic investigations carried on by the textile industry should uncover new scientific facts—and perhaps a few new theories—about such fundamentals as the structure of fibers and the nature of the dyeing process, and these things may be applied to textile mill practice, and may then result in better fabrics.

Textile men, therefore, should be very specific when preaching the need for technical research. The word "technical" is too indefinite. There is a danger that the industry may only be misled by preachments to emulate the laundry and dry-cleaning trades, and go no deeper than ordinary applied research. That way it can never be the leader in the new competition. The great need, as Dr. Howe said, is for fundamental research.

Remember, all applied research is the child of fundamental research. If we complacently apply the basic knowledge we have and neglect to dig for more, we merely indulge the child and let the parent starve. The child in this case is too old to pamper; for years we have been carrying on *applied* technical research in a rather general, haphazard fashion, nothing co-

operative except in one or two directions, as in the excellent work of the A. A. T. C. C. But no fundamental studies of importance are supported by the textile industry. All technical advances have drawn their nourishment chiefly from *old* basic discoveries.

The biggest problem facing those far-sighted agencies that preach fundamental textile research, however, is one of finance. In his article Silas Bent states that "corporations which maintain large laboratories assert that the return on their investment ranges from 500 to 1,000 per cent." How much greater would be this return if an entire industry made the investment! An industry can better afford to pursue fundamental research on an adequate scale than can a corporation, for this type of study promises no tangible return in dividends. The textile industry can make the investment if its members will only co-operate, and eventually the returns will be magnificent. If the thing is properly done it will mean leadership for American textiles in that new competition in which the research laboratory, not the tariff, will ultimately win.

"TEAMWORK FOR PROSPERITY IN THE TEXTILE INDUSTRY

By W. K. Wheeler

At the sixteenth annual meeting of the Chamber of Commerce of the United States held in Washington, D. C., May 7, 8, 9, 10 and 11, the following is one of the many resolutions adopted as guideposts of business:

"Chief among such responsibilities is that of purging business of all those who indulge in commercial and political corruption, and, through resort to unclean or unworthy practices, bring business into disrepute and shock the sensibilities of all decent citizens. The chamber declares that the moral turpitude of corrupteds of public servants is even greater than that of those whom they debauch.

"The chamber emphasizes its principle of business conduct which provides that 'corporate forms do not absolve from or alter the moral obligations of individuals.'

"It maintains that stockholders of corporations owe it to themselves, to the Government, and to the profession of business publicly to repudiate those who misrepresent them. Such stockholders cannot accept the profits flowing from corruption and escape the moral stigma which inheres in such profits.

"Neither can they permit those who act for them to profit personally through corrupt corporate transactions, or shield others who do."

The following from Nation's Business Extra Edition, June 5, 1928, is worth reprinting:

"The center, the rallying figure, of this meeting is a man of distinguished bearing, very sharp eyes and a pointed beard, Judge Edwin B. Parker, the outgoing chairman of the board of the chamber.

"Without dramatics, with few gestures, he electrifies the audience with his demand that organized business expel those 'pirates who flaunt the law and debauch public servants for ill-gotten gain, and whose motto is, "The public be damned!"' And with that stirring call to arms goes the warning that unless business purges itself, the public would loose thunder-bolts of wrath which might fell the just as well as the unjust.

"That speech straightens men up in their chairs. It inspires them to thundering applause. They will go out of the council chamber to talk it over day after day and finally they will resolve to purge business of those who deal in evil and wax fat by the corruption of public officials. No names are mentioned by Judge Parker or by the chamber, later on, but nobody is in doubt as to those to whom he referred. That stirring session was a rapid echo of public events. It was the outstanding single feature of the whole meeting."

"In its true significance teamwork among business men contemplates that each man so pursue the task he has set for himself that he will progress by virtue of his own abilities, of his own skill, of his own diligence, rather than through placing impediments in the way of others. This principle of business conduct has been proclaimed by this chamber in these words:

"Unfair competition, embracing all acts characterized by bad faith, deception, fraud or oppression, including commercial bribery, is wasteful, despicable, and a public wrong. Business will rely for its success on the excellence of its own service."

Then again from another account in the same magazine:

"There was drama in the annual dinner on the night of May 10. Unexpectedly to many, including this writer, a trim and good-looking middle-aged man, controlling perhaps the world's greatest fortune, came into the dining room hard after notifying the principal officer of one of the great oil companies that he would have to get out of business life—or at least any business life influenced by John D. Rockefeller, Jr. That was who it was, and the chamber rose to him with a mighty cheer and a handclapping. His appearance was dramatic, because his ultimatum to a leading oil corporation official came so pat after Judge Parker's demand at the opening session that business do its own housecleaning."

We textile men hear considerable about the existence of graft in our industry, and yet how many of us could actually prove such a condition? Personally, while there may be some graft, no doubt the greater majority of the men employed are honest and not subject to such a degrading practice. If graft does exist, however, there is only one thing to do, follow Mr. Parker's advice and clean house immediately from top to bottom.

In so doing, mill management also has a duty to perform. It should see to it that men in graftable positions receive sufficient recompense so that they will not be tempted to take graft. I am not so certain that management has often in the past been responsible for the crea-

tion of graft by its failure to pay sufficient wages and to reward meritorious work, resulting in improved processes and oftentimes considerable financial savings.

An acquaintance of mine was a chemist in a plant that recently went bankrupt. He told me afterwards that the place was full of graft and no doubt he knew. Incidentally he was "*ungraftable*," a point in his favor. He told me that one day he reported to the superintendent that the shipment of a certain dye was 20% weak and the superintendent asked him what difference that made, for the next would be 20% stronger and in the long run they would balance. Possibly a few other concerns have gone out of business the past few years helped along by just such conditions.

Another acquaintance of mine, a manufacturer whom I know well, told me one day that he could surprise me if he were to tell me the names of a few men in a large textile city who were receiving graft. When I told him I thought he was wrong, he said he was not, for in order to get his product into their mills he had to use graft.

Another "ungraftable" friend of mine, a chemist in another mill that recently went bankrupt, was offered a tidy sum of money every week if he would put a certain make of soap into the mill. He would not do this and told the salesman to get out of the mill and stay out. Possibly others in the plant were getting graft and thus hastened along the bankruptcy of the concern.

In a large textile mill graft may be produced by an epidemic recently started of discharging its old overseers and replacing them by younger fellows at much lower salaries. One of these younger men has a "graftable" disposition and a philosophy that runs something like this: "When I get to be fifty or sixty years of age I may expect, from past observations, to be discharged and until then I see no prospects of many salary raises; so the only thing for me to do to make my pile is to take whatever comes my way." And he will. In this case is not the mill partly to blame by the example set?

In Nation's Business Mr. Parker says: "We are not here to consider a teamwork among members of a particular group; to promote a prosperity measured solely in terms of profit to the members of that group, without thought of the interests and the welfare of every individual of every group within our nation. This is the miser's conception of prosperity, coldly, selfishly, narrowly calculating, a precarious prosperity because of its very narrowness." We can apply this part of his talk to the textile industry in regard to some of our imported foreign executives. Not infrequently they have to replace most of the overseers with men from their own country and moreover purchase most dyestuffs, chemicals and machinery from their native lands. Such a procedure should not be tolerated except in rare cases where better men, better dyes, better chemicals or better machines can be obtained from foreign sources. Why place our orders with foreign countries when we in our own country have *short time* and lack of work?

During the war we used to sing, *Keep the Home Fires Burning*; during *short time* why not sing, *Keep the Home Boilers Going*. If the foreign executive cannot become acclimated after a reasonable length of time, send him back to the place whence he came. We can, no doubt, do without him.

What we need in the textile industry to-day is the use of raw materials such as soaps, gums, starches, dyestuffs and other chemicals purchased at right prices. In other words, too many manufacturers of such products are making enormous profits at the expense of our industry.

In conclusion I would suggest that men in the industry read, Your Money's Worth, by Stuart Chase, obtainable at most public libraries.

CARL MERZ

Carl Merz, of the dyestuff manufacturing firm of Heller & Merz Company, died at his home in Newark, N. J., on Saturday, September 1. He served as secretary of the company for forty years and was widely known in the dyestuff trade. His passing is mourned by his many business associates and a host of friends in the industry.

COLUMBIA TEACHES COTTON MANUFACTURE

Instruction in the manufacture and finishing of cotton goods is being given this year at Columbia University, New York. The course is under the supervision of James W. Cox, Jr., M.E., consulting textile engineer; the instructor will be Herbert R. Mauersberger, B.T.E., a graduate of Lowell Textile School, who is associated with Mr. Cox. Starting with the opening of the winter session of Columbia University's evening school, September 28, the course will continue through a second part in the spring session, which begins February 8, 1929.

Each session will comprise fifteen lectures, and the complete course will cover the subject from the growing of cotton to the final analysis of many kinds of cotton goods, with a concluding lecture on "Cost and Production Calculations." All phases of manufacture, such as preparatory processes, spooling, warping, slashing and weaving, cloth analysis and construction, and the finishing of fiber, yarn and cloth will be dealt with.

The course is offered especially for commission-house men, converters, jobbers, merchants, buyers, salesmen and others handling cotton fabrics and products, and who, for business reasons, would like to know more about these materials. The lectures will be sufficiently scientific for accuracy, but not strictly technical, so that the lay person can follow them. Other courses in textiles, covering woolens, textile chemistry and silks are also given by the Extension division of Columbia University.

BLEACHING AND DYEING MUGA SILK

(*Continued from page 590*)

creasing the yield by tying them up to the trees in order that wild males of the same or an allied species may come along and fertilize them. By doing this they bring in some new blood, which would seem to be an excellent idea, although M. Basu does not appear to think it does the breed any very great amount of good. Though it may be true, his conclusion seems to be rather illogical and until further proof is received, it might be accepted with reserve.

No Filatures—A Home Industry

There are no filatures, in the ordinary sense of the word, for the reeling of this silk; it is entirely a home industry carried on by the raisers themselves. Some five or six cocoons are boiled in a pipkin over a fire in a solution of crude potash which is made from the burning of wood; a filament is taken from each and twisted together; this is wound on to a frame that is driven by the hand or foot of the reeler. For ordinary and low qualities the natives manage to work in a great part of the floss, but when they are preparing the best grade of thread they are careful to take all this away; as there is a good demand for the better grades, there is a considerable amount of waste silk formed. The following table will show approximately a comparison in this respect between Muga and Mulberry silks:

Production per 1,000 cocoons:

	Muga	Mulberry
Raw silk, ounces	10	9
Wastes, ounces	20	14

This comparison is interesting without being really valuable, for the wild silk is much heavier and coarser than the ordinary fiber and its quality is much lower. If the best gades of Muga silk were to be worked to compare with the middle grades, even, of Mulberry, the yield would probably be less than half.

The floss and other wastes are spun into a heavy yarn by the silk-growers and from it they weave a tolerably decent fabric that is used for clothing.

Bleaching Methods

The Indian users of Muga silk do not as a rule make any attempt to dye it; it is considered that its own beautiful golden color is sufficient for all purposes and it is therefore introduced into fine fabrics as an effect thread and colored border. In our own case, however, it might easily be necessary to dye it, and before this can happen, if the shade is a light one, the fiber must be bleached; this is not a particularly easy operation and it might be thought to add considerably to the cost of the material.

There is no doubt that the handiest method of bleaching is by the use of the peroxide of sodium; other ways have been tried but are less satisfactory. In common with the other 'wild' silks, this one has a heavier coating of sericin than is normally met with and is of a very hard nature; the degumming process therefore will require to be more drastic than ordinary; the soap solution will be stronger and the boiling time will be longer. When all the gum has been removed the silk, without further washing, is put into the bleach bath which has been made up to the following formula:—

Water, softened	120 gals.
Formic acid, technical, 85%	1¼ gals.
Phosphate of soda	¼ lb.
Peroxide of soda	10 lbs.
Turkey Red oil	2¼ pints

The mixing of the bath is a matter calling for some care if wastefulness is to be avoided. The Formic acid and phosphate are dissolved in the soft water, and then while the bath is being constantly stirred, the peroxide powder is shaken in a little at a time; if a lot goes in at once it will cause a local rise in temperature with loss of oxygen, and if the stirring is relaxed so that a quantity of powder is floating on the surface of the water, a similar loss will take place. When about nine pounds of the peroxide is in, the bath is tested with red and blue litmus paper to get at its condition; if the reaction is still acid, the remainder of the peroxide is stirred in and should it still be acid, some ammonia is added cautiously until it shows itself to be just alkaline. But if the bath is found to be in a strongly alkaline condition when the peroxide has been put in, it is best to check this slightly by a few drops more of formic acid, as a faint bluing of the test paper is all that is required for the work. Too much alkali will have the effect of degrading the natural luster of the silk.

Immediately the alkalinity of the bath has been found to be in order the Turkey Red oil is put in and the material is entered; the bath is heated by means of closed steam coils for one and a half hours until the temperature reaches 30° C. where it is kept for two hours, being then taken up to 50° quite slowly, and kept at that for the same period. The steam is then closed off and the silk permitted to remain in the bath until the following day or until such time as the color has been reduced to a satisfactory degree of paleness. It is never possible to bleach all the color out, but it can be considerably reduced by this means. A batch of between fifty and sixty pounds can be worked in a bleach bath made to the figures given; for ordinary mulberry silk, which might need bleaching for some purpose, this bath is too strong, but the 'wild' silks are far more resistant to the action of alkali.

The bleached fiber or fabric is rinsed in at least three waters.

There are formulas for bleaching which include a small amount of silicate of soda instead of the phosphate, which is put in to act as a regulator in the emission of the

nascent oxygen that effects the bleaching, but this reagent is not recommended for there is always a likelihood of amorphous silica being precipitated onto the fiber and producing a chalkiness which is hard to disperse.

Dyeing Not Difficult

To the dyer there is no serious problem in dyeing Muga silk, always provided that the shade demanded is not so delicate that it will be overset by the natural yellowness of the fiber; a slight bluing will, of course, be of some assistance though rather apt to produce a muddiness. Those dyes which are generally used for silk will be found quite satisfactory for Muga if used in a shorter bath rather more concentrated; the time of dyeing, also, will need lengthening.

Black is one of the colors that will be most usually called for on this class of silk, and for this purpose any good dyestuff will do; the work is done at the boil in a bath of broken boil-off liquor, and when the work is almost completed, a small quantity of formic acid is added in order that the bath may be still further exhausted. It is as well to run standing-baths whenever the economic value will permit; that is to say if the call for black on Muga is not great, the standing-bath intended for ordinary silk may be brought into use by making a larger addition than would usually be made.

The final wash after dyeing is given in water containing a small addition of formic acid, about half a pint or a little over for a batch of the size described; this adds to the brightness and handle of the goods. When the dyeing is omitted, this scrooping bath may be the final after-washing from bleach. It is always as well to get it in as a last treatment of any run of milling operations.

It will be gathered from the description given that the raising and reeling of Muga silk is a very primitive process and not a little uncertain in its yield, but the silk is good and has a distinct value; if, therefore, there was a bigger call for it, there would automatically be an improvement in the production and silk users would benefit by obtaining a new source of supply of a very beautiful fiber.

DE HAEN-RIEDEL MERGER

The firm of E. de Haen, A. G., Seelze, Hannover, Germany, has combined with the firm of J. D. Riedel Akt. Ges. and will be known in future as J. D. Riedel-E. de Haen, A. G. There will be no change in the business or policy of this firm. Both firms have been under the same ownership and very closely related for the past few years; the actual merger only gives expression to this fact.

The E. de Haen Works of the J. D. Riedel-E. de Haen, A. G., will continue to be represented in the United States and Canada by the firm of Pfaltz & Bauer, Inc., New York City.

RECENT PATENTS

United States Patents

Process of Producing Light-Colored and Color-Fast, Hard Infusible and Insoluble Products of Condensation of Phenols and Aldehydes. (Consisting in subjecting the same to condensation with an alkali and subsequently adding to the product of reaction boric acid in order to form the salt of this acid.) Leonhard Deutsch and Isak Thorn, of Vienna, Austria, assignors to the Selden Company, of Pittsburgh, Pa. No. 1,678,175; July 24, 1928.

Azo-Dyestuffs from 2-3 Hydroxynaphthoic Acid Arylides and Process of Making the Same. (New dyestuffs producing valuable color lakes, on substrates and clear reddish shades on vegetable fibers of an excellent fastness to kier boiling.) Leopold Laska and Arthur Zitscher, of Ocenbach-on-the-Main, Germany, assignors to Grasselli Dyestuffs Corporation of New York, N. Y. No. 1,678,599; July 24, 1928.

Manufacture of Indigo. (A new and improved method of handling the fused indoxyl.) Charles J. Strosacker and Chester C. Kennedy, of Midland, Mich., assignors to the Dow Chemical Company, of Midland, Mich. No. 1,678,619; July 24, 1928.

Polymerization and Purification of Hydrocarbons. (Comprises emulsifying a polymerizing agent and naphtha containing polymerized constitutents.) Stuart P. Miller and Joseph Bennett Hill, of Philadelphia, Pa., assignors to the Barrett Company. No. 1,679,093; July 31, 1928.

Method of Sulphonation. (An improved method of sulphonation of organic substances which are normally solid in character; of special value in conjunction with the manufacture of dyestuffs and intermediates, for example, dyestuffs of the triphenylmethane series.) Henry B. Faber, of Buffalo, N. Y., assignor to National Aniline & Chemical Company, Inc., of New York, N. Y. No. 1,679,211; July 31, 1928.

Indigoid Dyestuffs. (New unsymmetrical indigoid dyestuffs and materials dyed therewith.) Hermann Staudinger, of Zurich, Richard Tobler and Robert Stocker, of Basle; Jakob Muller, of Munchenstein, near Basle, and Armin Bucher, of Basel, Switzerland, assignors to Society of Chemical Industry in Basle, of Basle, Switzerland. No. 1,679,277; July 31, 1928.

Purification of Indanthrene. C. I. 1106, Indanthrene Blue B. (By a process which effects the purification directly from solution of melt.) Donald C. Rogers, of Brooklyn, N. Y., assignor to National Aniline & Chemical Company, Inc., of New York, N. Y. No. 1,679,230; July 31, 1928.

Sulphur Dyestuff. (Production of a new sulphur dyestuff, for dyeing cotton goods in colors ranging from tan to greenish bronze, and for producing khaki

shades, by the reaction of sulphur on metatoluene diamine, paraphenylene diamine and dehydro-thio-toluidine.) Lincoln M. Shafer, of Jersey City, N. J., assignor to Tower Manufacturing Company, Inc. No. 1,675,430; July 3, 1928.

Sulphur Dyestuffs. (A new sulphur dyestuff, dyeing cotton orange shades of excellent fastness to boiling, obtained by heating 2-nitro-acetyltoluidine to a temperature of 200 to 260° C. with sulphur in the presence of about 2-8 mols benzidine.) Edwin Kramer, of Cologne-Deutz, Germany, assignor to Grasselli Dyestuff Corporation, of New York, N. Y. No. 1,675,498; July 3, 1928.

Sulphur Dyestuff Dyeing Cotton Yellow. (A new sulphur dyestuff, dyeing cotton a clear greenish shade of an excellent fastness to boiling, obtained by heating 3-amino-acetyltoluidine to a temperature of about 180 to 260° C. with sulphur in the presence of 2-8 mols benzidine.) Erwin Kramer, of Cologne-Deutz, Germany, assignor to Grasselli Dyestuff Corporation, of New York, N. Y. No. 1,675,499; July 3, 1928.

Hydroxy-Naphthalene-Arylsulphoester Azo Dyestuff and Process of Making the Same. (Production of very valuable orange to reddish-violet azo dyestuffs distinguished by clear shades and excellent fastness to light and milling when applied to animal fibers.) Wilhelm Neelmeier, of Leverkusen, near Cologne-on-the-Rhine, Germany, assignor to Grasselli Dyestuff Corporation, of New York, N. Y. No. 1,676,407; July 10, 1928.

Hydroxy-Naphthalene-Arylsulfoester Azo Dyestuff and Process of Making the Same. (Continuation of Patent 1,676,497 above.) Wilhelm Neelmeier, of Leverkusen-on-the-Rhine, Germany, assignor to Grasselli Dyestuff Corporation, of New York, N. Y. No. 1,676,458; July 10, 1928.

Manufacture of Trisazoic Coloring Matters. (New coloring matters, dyeing cotton gray to black and extremely fast to light and washing, produced by coupling a diazo derivative of the benzene and naphthalene series with a diazotizable component of the naphthylamine series, according to a certain formula.) Oskar Knecht and Hans Brutsch, of Basle, Switzerland, assignors to Society "Chemical Works formerly Sandoz," of Basel, Switzerland. No. 1,676,562; July 10, 1928.

Chromium Compound of Pyrazolone-Azo-Dyestuff and Process of Making Same. (Relates to new chromium compounds of pyrazolone-azo-dyestuffs produced by treating those azo-dyestuffs which are obtained by uniting ortho-hydroxy-diazo compounds with 3-methyl-5-pyrazolone, with agents yielding chromium, dyeing wool fast orange to red tints.) Fritz Straub and Gillaume de Montmollin, of Basle, and Max Schmid, of Riehen, near Basel, Switzerland, assignors to the firm Society of Chemical Industry in Basle, of Basle, Switzerland. No. 1,676,581; July 10, 1928.

Ortho Hydroxyazo Dye. (Dyeing wool orange to brown tints which become red to bluish-red when chromated, obtained by coupling a naphthalene-1.2-diazo-oxide-4-sulphonic acid, or a derivative thereof with a 1-aryl-3-methyl-5-pyrazolone.) Oskar Kaltwasser, of Berlin, Hans Oehrn, of Charlottenburg, and Hermann Kerchoff, of Berlin-Lichterfelde, Germany, assignors of Mesne Assignments to Grasselli Dyestuffs Corporation, of New York, N. Y. No. 1,676,697; July 10, 1928.

Normal Amylyl Resorinol. (New acyl resorcinol, prepared by reacting with valeric acid on resorcinol in the presence of a condensing agent, such as zinc chloride. Continuation in part of prior application Serial No. 654,928; filed July 31, 1923.) Alfred R. L. Dohme, of Baltimore, Md., assignor to Sharp & Dohme, Inc., of Baltimore, Md. No. 1,677,116; July 10, 1928.

Metal Compound of Azo Dyestuff and Process of Making Same. (Relates to new dyestuffs valuable for production of fast tints on the fiber, yielding on wool, when after-coppered, red-violet to blue-violet, when after-chromed, violet to blue and black-green fast tints.) Fritz Straub, of Basle; Hermann Schneider, of Riehen, near Basel, and Joseph Spieler, of Basle, Switzerland, assignors to Society of Chemical Industry in Basle, of Basle, Switzerland. No. 1,677,634; July 17, 1928.

Solid Diazosalt. (Ferdinand Keller, of Offenbach-on-the-Main-Burgel and Karl Schnitzenspahn, of Offenbach-on-the-Main, Germany, assignors to Grasselli Dyestuff Corporation, of New York, N. Y. No. 1,677,640; July 17, 1928.

VALUE OF TEXTILE IMPORTS DECLINE SLIGHTLY

United States imports of textile fibers and manufactures declined in value during the first six months of this year, according to a report by E. A. Mann of the Textile Division of the Department of Commerce.

The decrease in imports amounted to only three per cent, however, the total for the first half year period being approximately $479,223,000. Unmanufactured textile fibers—raw cotton, jute, flax, hemp, manila, sisal, kapok, and other vegetable fibers, wool, mohair, animal hair, silk and rayon—accounted for about 60 per cent of the value of textile imports during the period.

Despite a huge domestic production of rayon (estimated by the trade at 95,000,000 to 100,000,000 pounds for the calendar year 1928, on the basis of current activity and demand), the United States continues to import substantial quantities of rayon yarns. Receipts of foreign rayon yarns, threads, and filaments, however, declined in quantity from 7,916,000 pounds in the first half of 1927 to 6,047,000 in the first six months of 1928. Continental countries comprise the principal source of rayon yarn imports.

RECENT LITERATURE

Another Edition of Schultz-Julius

A new, seventh edition of the Schultz-Julius Dyestuff Tables will be published this fall, brought up to date by Dr. L. Lehmann. It will be distributed by the Science Press Distributing Company of New York and will be published in two volumes.

The first volume of this edition will consist of about twelve parts or 1,200 pages. Volume II will comprise six parts containing approximately 600 pages. The price for each part, according to the distributors, will be $2, although mention is made of a special subscription offer for early orders.

A new edition of Ullmann, *Enzyclopaedie der technischen Chemie*, is progressing rapidly, according to the Science Press Company. Volume I of this work is now ready and subsequent volumes will be issued at the rate of one every six months.

An Address

Impressions of the Textile Industry of To-day. By John E. Edgerton. Philadelphia Textile School. 7 pages.

"The industry needs now and will need in increasing degree not only dependable direction in the scientific development of mechanical processes to meet multiplying necessities, and not only facilities for research which is becoming daily more necessary to our economic progress, but well-trained men upon whom in the last analysis hinge the successful operation of all machinery and the values of all scientific formulas." With these words of wisdom the president of the National Association of Manufacturers closed his address at the Annual Banquet of the Alumni Association of the Philadelphia Textile School. This booklet contains the complete address and is well worth reading.

For Silk Mills—A Cost Accounting Manual

No matter how large a silk mill is, no matter how small, it can be made efficient. One definite step toward greater efficiency can be made by planning all operations on the basis of an intelligent cost system. To enable broad silk manufacturers to install or devise such a system is one purpose of the Cost Accounting Manual that will come from the press this month and be distributed by the Silk Association of America.

For the past year the cost manual has been in the process of compilation and is now receiving its final revision under the direction of the cost committee. Whether a silk mill is large or small, the manual provides for a cost system flexible enough so that it may be made as elaborate or as simple as the individual concern desires and as the type of production necessitates. Simplicity of operation has, in fact, been the guiding factor in the selection of the cost accounting system.

After working out a complete departmentalization of operating expenses, the committee turned its attention to the defining and explaining of different items of expense with their disposition in charges to the accounts and to the product. The questions of interest, expenses for equipment and charges for imperfect merchandise have been taken up. A table of depreciation rates has been compiled. All cost elements have been included by tying in the cost figures with the general books of accounts.

The adoption of this cost accounting system by silk firms will result, it is expected, in concrete benefits to the individual concern. It will eliminate guess-work in figuring cost. It will eradicate the possibility of wrong distribution of overhead between different qualities of silk, a factor which, it is generally recognized, has caused a large difference in cost figures up to the present time. It will insure the inclusion of all cost and shrinkage elements into the final cost figure.

The Function of the Foreman

The Foreman and Labor Turnover. 15 pages. Policyholders' Service Bureau, Metropolitan Life Insurance Company.

"Perhaps, more than anyone else, the foreman can control Labor Turnover," according to the third booklet in the Labor Turnover Series just issued by the Policyholders' Service Bureau of the Metropolitan Life Insurance Company; "he can help employees become adjusted to their work quickly, he can develop loyalty, and he should be the first to learn of problems and difficulties which confront every wage-earner from time to time."

The Foreman and Labor Turnover contains a composite of the views of forty manufacturing concerns on the position of the foreman. To the study, these manufacturers have contributed their ideas of what he can accomplish, the best means for bringing about his accomplishments, and his methods for maintaining interest among employee groups. The incentives which these manufacturers offer to foremen to control labor turnover in their individual departments are outlined as well.

The study, in common with all other surveys made by the Policyholders' Service Bureau, was prepared at the request, and for the benefit of Group Insurance policyholders. However, extra copies are available to others interested in the subject. These will be mailed on request.

An Index of Publications

A useful little "Index of Publications" has been issued by the Policyholders' Service Bureau of the Metropolitan Life Insurance Company. In this booklet are listed the numerous bulletins and reports issued by the bureau on

a variety of subjects of great interest to employees and employers of industrial firms, to executives, advertising managers and engineers. The series of interesting brochures on "Better Business Through Research in New England Industry," for example, are listed in the index. This series comprises a number of excellent reports on "Applying Research to Sales Analysis" and on "Production Research." Other bulletins listed cover industrial health, safety, employment practice, budgeting, etc. A copy of the index will be sent without charge by application to the Metropolitan Life Insurance Company, 1 Madison Avenue, New York City.

Figures for Business Men

How to Use Current Business Statistics. United States Department of Commerce, Washington, D. C. Foreword by Herbert Hoover. Price 15 cents.

The interpretation of business reports and statistics is explained in this booklet for the business man in non-technical language, with 283 specific examples and seven charts. The number of practical applications cited can be of great advantage even to those who are now making use of statistics. The collection of current statistics, the use of figures in solving various economic problems and the interpretation of figures are among the chief topics discussed.

Standards for Nearly Everything

Standards Year Book—1928. National Bureau of Standards, Department of Commerce, Washington, D. C. 400 pages, 6 x 9, illustrated. Price $1.

Every year the forces of the standardization movement advance farther into the ranks of industry. Their conquests are announced continually in the trade and technical press of the country; standards are being formulated for every conceivable material and commodity, in the name of industrial efficiency. The missionary work of trade associations enlisted in this great movement has proved to be one of the most powerful factors in its advance. The united action of many manufacturers in one industry is in that manner brought to bear upon the problems of standardizing the materials or products of that industry. But the agency whose influence has probably been most strongly exerted in the cause has been the National Bureau of Standards. In its Year Book the story of standardization is brought up to date every twelve months and the co-operation by which the movement progresses is interestingly explained.

The Standards Year Book outlines the activities and accomplishments not only of the bureaus and agencies of the Federal Government but also those of states and municipalities. It also gives a valuable resume of the standardization work of scientific and technical societies and trade associations. An extensive bibliography on standardization is included in the text of the Year Book. The volume should be on the desk of every executive and technical man who wants to keep informed on the progress of the movement that he or his firm may assist in the good work.

Book Chat

Recent Trade Literature Takes the "Safe" Side

Better be safe than sorry is an old maxim, but its age does not detract one whit from its truth. The chemical industry has had "safety first" dinned into its ears for many a year, but all evidence would seem to point to the fact that it is not yet time to stop "hollerin'." A monograph on Safey in the Chemical Industry is even now under course of preparation by the Chemical Section of the National Safety Council (Chicago) and will probably be ready this fall. *Watch for it.*

And while on the subject, it might be mentioned that the American Engineering Council has recently published a report on accidents in the chemical industries. This study was undertaken at the suggestion of the National Bureau of Casualty and Surety Underwriters and deals with twenty basic industries and 120 types of products: in all, the pooled experience of 14,000 companies. . . .

The study disclosed that a positive indirect relationship between accidents and production exists throughout American industry, which means that in those cases where production has increased in general the *accident* rate has decreased, and where organized safety campaigns are conducted, remarkable reductions have been made in both frequency and severity of accidents. But the report also concludes that there exists room for considerable enlargement of a safety program in industry. . . . The report should be studied by executives in the chemical and textile industries. . . .

From safety to water may seem like a broad jump in thought, but mill practice in processing textiles has long demonstrated that if you are not getting the right water you are not working *safely;* here, however, the accidents happen not to the workers but to the goods . . . and goods cost money . . . all the more reason why interest attaches to the bulletin issued from the technical laboratory of the R. K. Laros Silk Company, a bulletin on "Water." It is nicely printed and illustrated and makes easy reading for tired mill chemists. . . .

Efficient mills make their wet processes *safe* in more ways than one. By using reliable thermometers, for instance, and other control and indicating instruments. An interesting bulletin on resistance thermometers has just been issued by Leeds & Northrup Company. It describes lucidly this firm's instruments for controlling, recording and indicating temperatures, for use in many different processing industries; the text is illustrated profusely with pictures of instruments and installations. . . . The bulletin is known as Catalog No. 80. . . .

Why the booklets and bulletins on our desk for review this time all seem to revolve around the subject of safety is not a question we can explain without thought. . . . and the book review desk does not happen to be

in the mood for *heavy* thought at present . . . anyway, here is another bulletin that talks about "hazards" and such things, this time hazards in *exporting*. There are not so many as business men believe, says the bulletin, and merely to support this point it mentions the fact that "this belief was expressed by many exporters" in a recent survey of New England, made by the Policyholders' Service Bureau of the Metropolitan Life Insurance Company (which has been mentioned before in these columns). . . .

But to return to our bulletin, it contains the results of the survey and is the third in the admirable series on the general subject, "Applying Research to Sales," the title of this particular booklet being "The Use of Research in Developing Foreign Trade." As usual copies may be obtained free from the Metropolitan Insurance Company . . . and that seems to bring us to the bottom of the pile, so we shall sign off with a promise of more—and *better*—gossip in the next instalment. Meanwhile, "safety first." C. H.

CORRESPONDENCE

THE TESTING OF SULPHONATED CASTOR OILS

EDITOR,
American Dyestuff Reporter:

Prof. Albert H. Grimshaw's article published in the REPORTER on March 5, 1928, has already been followed by much discussion in your columns (Thomas in the REPORTER of May 14, 1928, and Post in the August 20 issue). Much of value has been said, but several points of importance has been left unsaid in this discussion.

Prof. Grimshaw points out that "Turkey Red oil is valued on the amount of total fatty matter in the sample." With this opinion, Mr. Thomas seems to be in agreement, but he disagrees on the methods recommended by Prof. Grimshaw for determining the total fatty matter. Mr. Thomas recommends gravimetric methods while Prof Grimshaw recommends volumetric methods "if only comparative results are desired" Mr. Post argues that even gravimetric methods, as mentioned by Mr. Thomas, do not measure the quality of the oil.

It has been our experience that certain volumetric methods are accurate within 1% if used for comparative tests of oil produced by the same manufacturer. Mr. Thomas' recommended methods are more accurate and, therefore, preferable for testing oils prepared by different manufacturers. However, these methods require more apparatus and more careful control for accurate results than the average mill laboratory or plant usually devotes to such tests. A volumetric test of an oil, such as Mr. Post mentions, yields unduly high fat content results while a gravimetric test would show its true fat content—considerably lower than the volumetric test would indicate.

To judge a sulphonated oil merely by its total fat content is as misleading as to judge it by its combined SO_3 content. In our opinion, there has recently developed considerable discussion regarding a high combined SO_3 content oil which appears, in many cases, to be "sales propaganda" under the guise of scientific discussion. In some instances, this factor is of great importance; but in most cases, the quality of the castor oil itself, its purity and uniformity, the control during the sulphonating process, the actual total fat content and the results produced by the oil in practice are of greater importance.

Prof. Grimshaw's methods are sufficiently accurate for rapidly comparing oils made by the same manufacturer; for comparing oils of different manufacture, purchased on a fat content basis. Mr. Thomas' gravimetric methods are to be preferred. The question of the quality of the oil, aside from its fat content, was not the subject of Prof. Grimshaw's article. That question can hardly be discussed intelligently without considering, among many other factors, the practical purpose for which a particular oil is intended.

WILLIAM SELTZER,
Chief Chemist,
Jacques Wolf & Co.

EDITOR,
American Dyestuff Reporter:

Mr. C. I. Post feels that I am somewhat critical of rough methods of testing.* I admit the charge. Chemistry has a far more valuable service to render textile mills than rough tests. Textile mills which employ chemists to work without facilities cannot expect results of high value. As a matter of fact, the apparatus does not need to run into a large outlay.

Mr. Post seems to feel that with the same water content, it is possible to increase the mineral part of a sulphonated oil without at the same time decreasing the fatty part. I must admit that I cannot make figures work that way. It may be all right to call SO_3 fatty matter when it is combined with fatty matter, but the best practice is to report them separately. The value of a highly sulphonated oil is not, and cannot be, disclosed by the percentage of fatty matter alone.

W. H. THOMAS,
Technical Director,
Herrick-Voight Chemical Corp.

*Editor's Note: The above letter is in reply to one signed by C. I. Post and published in the August 20 issue of the "Reporter," page 554. At our request W. H. Thomas has written a special article upon "The Analysis of Sulphonated Oils," which is published elsewhere in this issue.

National Spun Silk Company, New Bedford, Mass., has under consideration the establishment of a finishing plant. It is understood that plans depend upon their ability to get a satisfactory water rate from the city.

A SIMPLE CHART FOR SELECTING STEAM PIPE

By W. F. Schaphorst, M. E.

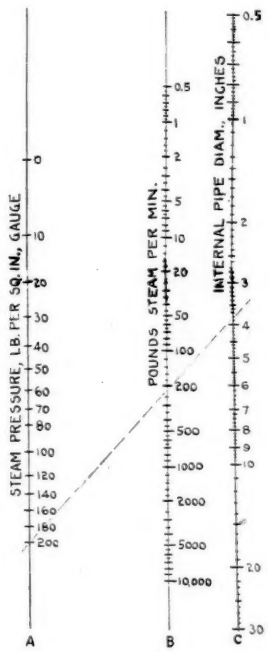
ACRES of pages, perhaps, have been devoted during recent years to steam charts and formulas, but, unfortunately, both the charts and formulas are usually more or less bewildering.

Herewith is an effort by the writer to make a chart as simple as possible—a chart that requires only one operation for the solution of the problem—a chart that is based upon the velocity of steam that is used most, namely, 6,000 feet per minute.

For example, what size steam pipe shall be used where the steam pressure is 200 pounds gauge and where 225 pounds of steam are to be used per minute?

The dotted line across this chart shows how easily it is done. Simply run a straight line through the 200 column A and the 225 column B and the intersection with column C gives the answer as 3.82 inches internal pipe diameter. This is very close to a 4 inch pipe and therefore a 4 inch pipe would be used.

If the steam pressure is known (column A), and the



pipe is already installed, the diameter of course is a known quantity (column C) and the pounds of steam that the pipe will carry per minute is easily determined by simply connecting the known factor in column A with the known factor in column C and the intersection with column B gives the pounds of steam per minute.

This chart will be found satisfactory for most short pipes where the pressure drop is very small, amounting to only 2 or 3 pounds, and is consequently almost negligible. Most steam pipes are short and it therefore is unnecessary to worry about the complexities to be found in most of the steam flow formulas commonly seen in print.

This chart is based upon the following very simple rule which may be used for checking purposes or for working out the problem in longhand if the reader prefers to use pencil figures rather than the chart. The rule is: "Multiply the internal diameter of the pipe in inches by itself, then multiply by 32.9 and then multiply that by the weight of one cubic foot of steam at the pressure used." The result is the pounds of steam per minute that will be carried by the pipe. The weight of steam per cubic foot may be found in most engineering handbooks. However, rather than go to the trouble of looking up these weights, for short pipe installations where absolute hair breadth accuracy is not essential and where 6,000 feet per minute velocity is satisfactory this chart will serve the purpose very well indeed.

TEXTILE HIGH OFFERS COURSES IN SILK AND RAYON MANUFACTURING

THE demand for technically trained men for positions in silk concerns in the metropolitan area has in turn created a demand for adequate courses of instruction in the manufacturing of textiles in general and silk and rayon in particular. Among those agencies that have undertaken to supply courses of this kind is the Textile High School, 124 West 30th street, Manhattan. Courses in silk and rayon manufacturing opened at this school last week.

In announcing these courses Textile High School states that the silk industry offers a genuine future to various types of young men who will work conscientiously and who will prepare themselves with the proper technical education. Those who are of the artistic type can follow the designing branch of the industry; if the student is mechanically inclined he can profit by working in the manufacturing field. Even those who desire to enter the selling branch of the silk industry will find it to their advantage to know the technical aspects of manufacturing as fully as possible; while the chemical and analytical group will find equal opportunities for development and success.

The courses given at Textile High School are under the direction of Joseph Kaskel, a graduate of the Technical Institute of Weaving at Krefeld, Germany.

The day course will be divided into four groups, weave construction and their production; silk fabric analysis; textile machinery; merchandising. Under weave construction will be taught the principal weaves and derivatives and how to construct new formations. The work of silk fabric analysis will cover textile fiber identification and recognition of woven material. The mill calculations of the principal silk fabrics will be taught. An analysis by each student individually will be required of samples procured in the open market. So that these two groups will be thoroughly comprehended by the class, the practical and theoretical side of the machinery used will be developed in a separate section.

SAFETY COUNCIL MEETS OCTOBER 1 IN NEW YORK

Textile and Chemical Sections to Hear Important Papers—Plant Workers' Health and Safety Slated for Full Discussion

INDUSTRY can never call itself truly efficient while the record of its present accident rate stands to contradict it. That is why all industrial executives should find so much of interest in the program of the annual meeting of the National Safety Council, which convenes in the Hotel Pennsylvania, New York, during the week of October 1.

This year's meeting marks the Seventeenth Annual Safety Congress. Homer E. Niesz, president of the N. S. C., will preside.

The first day's session will be featured by election of officers, etc., and several inspirational addresses. Various sections of the council, representing different industries, will hold their meetings during the remainder of the week, and among these the Textile and the Chemical sections stand out prominently as of greatest interest to readers of the REPORTER.

Five New York City hotels will be required to accommodate the 110 sessions, 325 speakers and 6,000 delegates.

"Safety in the Textile Industry" is the subject of an address to be delivered by Russell T. Fisher, secretary of the National Association of Cotton Manufacturers, before the Textile Section on Tuesday morning, October 2.

Commissioner Ethelbert Stewart, of the U. S. Bureau of Labor Statistics, Washington, D. C., is scheduled to speak on "Safety for the Textile Industry," after which there will be a general discussion.

On Wednesday morning, October 3, following the election of the Textile Section officers, there will be a symposium entitled "How We Want Safety Work Conducted," in which will participate John H. Perkins, of the Harmony Mills, Cohoes, N. Y.; D. Frank Lord, M. J. Whittall Associates, Worcester, Mass., and Glenn W. Cook, of the Travelers Insurance Company, Hartford, Conn.

Every company in the textile industry is cordially invited to be represented at the coming convention, irrespective of membership affiliations with the National Safety Council. There will be no charge for admission to any of the business sessions.

CHEMICAL SECTION

An extensive program has been arranged for the meetings of the Chemical Section, which open on Monday, October 1, when there will be a luncheon in the Hotel Pennsylvania. Dr. H. C. Parmelee, editor of the Journal of Chemical & Metallurgical Engineering, is to present "Some Recent Observations on Safety in Chemical Engineering." John S. Shaw, manager of the safety and service division, Hercules Powder Company, Wilmington, is to lead a round-table discussion of "Safety in the Chemical Industry."

On Tuesday morning, October 2, Dr. Frank P. Underhill, of the Yale School of Pharmacology and Toxicology, is to discuss "The Treatment of Chemical Burns." There will be a general discussion of "Health Hazards in the Chemical Industry," in which will participate C. T. Graham-Rogers, assistant director, Bureau of Industrial Hygiene, New York State Department of Labor; G. H. Gehrmann, M.D., medical director of E. I. du Pont de Nemours & Co., and Walter S. Paine, research engineer, Aetna Life Insurance Company.

On Wednesday morning, A. L. Armstrong, safety engineer, Eastman Kodak Company, and Carl F. Coffelt, safety director of the Victor Chemical Works, will dwell on "The Status of the Chemical Industry as Revealed by Accident Experience," and Dr. Yandell Henderson, physiologist, Yale School of Medicine, is to talk about "Gas Masks and Respirators." Three speakers will discuss "The Safe Handling of Compressed Gases," among them being J. I. Banash, a Chicago engineer.

On Thursday morning, J. H. Shapleigh, of the Hercules Powder Company, Kenvil, N. J., will talk about "Gauging and Sampling." Other discussions will relate to "Safety in Chemical Apparatus" and various timely questions.

Corporations which have several plants should be interested in the questions to be discussed at a special session for Group Plant Safety Supervisors. This particular session will be held on Tuesday afternoon, October 2, at the Pennsylvania Hotel, where W. H. Winans, manager industrial relations, Union Carbide Company, New York City, will preside as chairman.

"How We Keep Safety at Work in Our Distant Plants" will be told by M. G. Hoyman, staff superintendent of service, Kimberly-Clark Company; B. O. Pickard, safety engineer, Pacific American Steamship Association, San Francisco, is to dwell on "Sowing Seeds in the Major Departments of a Company"; Charles B. Scott, past president of the National Safety Council, is to discuss "What Should Be the Status of the Group Plant Safety Engineer in the Organization with Which He Is Connected?" and Ernest W. Beck, supervisor of safety, United States Rubber Company, New York City, is slated to speak on "The Elements of a Successful No-Accident Contest."

SESSION FOR EXECUTIVES AND ENGINEERS

Arthur T. Morey, general manager of the Commonwealth Steel Company, Granite City, Ill., may preside at the special session for industrial executives and engineers which will be held on Wednesday afternoon, October 3, at the Pennsylvania Hotel.

H. W. Heinrich, assistant supervisor, engineering

division, Travelers Insurance Company, is to talk on "The Origin of Accidents." L. A. De Blois, director, safety engineering division, National Bureau of Casualty and Surety Underwriters, will discuss "Safety and the Individual." A. W. Berresford, vice-president of the American Engineering Council, is to dwell on "Safety and Production." A. H. Young, secretary, Industrial Relations Counselors, Inc., will talk about "Safety and Labor Relations."

"Are we producing results in safety by blind chance, or have we gone about it in a scientific way?" is one of the questions which will be discussed by the delegates. This special session will be held jointly with the American Society of Safety Engineers.

Health Session

"The Economic Value of Life and Health in Industry" is the subject of an address to be delivered by Louis I. Dublin, M.D., statistician of the Metropolitan Life Insurance Company, at a special health service session scheduled to be held on Tuesday afternoon, October 2.

Howard Cheney, of Cheney Bros., South Manchester, Conn., is to dwell on "Continuity of Service," and a speaker, whose name is to be announced in the final edition of the congress program, is to discuss "The Organization and Conduct of a Plant Medical Department."

Industrial health, which is assuming an increasingly important place in the accident prevention movement, has been given further recognition by the National Safety Council, which announces the appointment of Clarence Olds Sappington, M. D., as director of the Health Service Division of the council.

STILL STEALING DYE FORMULAS

Chemists' Arrest Reveals Spy System

A well organized spy system operating in the dye and chemical plants of the I. G. Farbenindustrie is reported to have been revealed recently when three chemists were arrested at the Leverkusen plant of the German trust. It was declared that this espionage system, which was discovered through the activities of the intelligence department maintained by the I. G., has been carefully developed to cover the company's plants in and outside the occupied territory. The arrested men admitted that practically every I. G. plant employs a number of Germans attached to the French secret service. The police inquiry is still being carried on and further arrests are pending, it is stated in a dispatch to the Daily News Record.

A statement, issued by the I. G. Farbenindustries, says that according to what has been found out so far, several unimportant formulae for aniline dyes have found their way into France, but that the attempts made to obtain details of various new processes, such as the coal liquefaction, and some new departures of the Indanthrene dye processes were found out before actual information which can be used commercially was obtained. While the "Koelner Zeitung" reported on this at length, the I. G. Farbenindustrie themselves do not appear to attach too much importance to what they describe as an everyday occurrence almost in their various plants. They declare that their system is so developed that no one employee has access to complete information regarding any one process which is not public property.

ALCOHOL FROM SISAL FIBER

A factory for industrial tests has been erected in the French Sudan on the plantation of the Societe des Agaves des Diakandape (near Kayes) by the Fouque Mission, and after much research Monsieur Fouque is said to have succeeded in creating a method of industrial treatment for sisal waste for the production of alcohol. His studies entailed a continual modification of process and changes in the distilling apparatus but the process finally evolved is said to give excellent results.

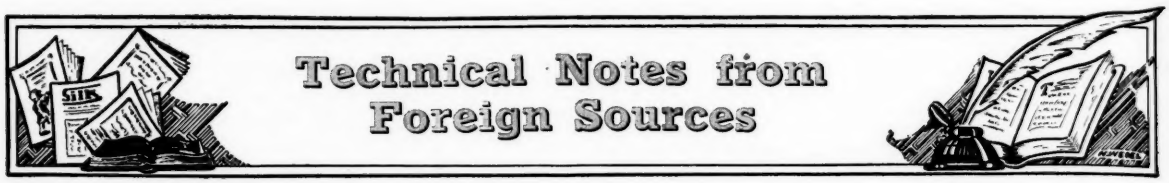
According to a description of the process supplied by Vice Consul Slawson of Paris, it appears that it constitutes an entirely new method of exploiting the sisal plant. It will permit the production not only of an industrial alcohol susceptible of use as a carburant at low cost, but likewise of a solid combustible taken from the waste after the sugared juice has been removed, which may further be used, and also the manufacture of a fertilizer containing mineral and other elements coming from the fiber wastes and added substances.

LARGE BRITISH DYEING FIRMS MAY MERGE

Rumors that have not been confirmed persist in linking three of the largest dyeing firms in Great Britain in a heavily capitalized merger. It may be all newspaper talk, according to one observer, but still the rumor specifically names the Bradford Dyers' Association, Ltd., the British Cotton and Wool Dyers' Association, Ltd., and the Yorkshire Indigo, Scarlet and Color Dyers, Ltd., as the three units comprising the proposed consolidation. These interests control eighty separate firms and involve a capital of approximately ten million pounds sterling.

THE I. G. EXPERIMENTS WITH OIL

Dr. Friedrich Bergius of Heidelberg recently told Netherlands chemists, meeting at their twenty-fifth annual jubilee, that oil fractions produced by the German dye trust from coal hydrogenation could now be converted into gasoline. A new I. G. improvement on the process, according to advice from Trade Commissioner Daugherty of Berlin, now permits the trust to recover light or heavy oils as desired.



Application of Ultra-violet Rays in Textile-Chemical Investigation

Dr. Nopitsch—Melliand's Textil-Ber. 136.9 (1928)—The presence of ultra-violet radiation in sunlight, it is now agreed, is responsible for the fading of dyeings, and the use of these rays (or rather of light rich in them) as a substitute for sunlight in testing the fastness of dyes to light is a common matter. The usual apparatus employed for their source is the familiar mercury arc-lamp inclosed in a quartz container, since, as is well known, ordinary glass does not transmit much or most of the ultra-violet rays. But the so-called ultra-violet light from such a source contains, beside the ultra-violet, other components of the spectrum in the visible part, principally in the visible violet and blue region. It is possible to remove these components (filter them out) nearly completely by causing the light to pass "through a very dark glass" (color, etc., not stated). In this way an ultra-violet radiation can be obtained which, when impinged upon objects or materials, does not render them visible except by the phenomenon called luminescence; that is, the material in the ordinary sense is invisible, except that it becomes perceptible to the eye through the translation, so to speak, of the ultra-violet rays into the visible rays of a different wave-length—toward the red end of the spectrum. Thereby a characteristic color, dependent upon the color of the material in daylight (and usually different from that color) is imparted to the material.

A considerable amount of work has been carried out along lines seeking to utilize this difference in appearance as a qualitative criterion for various substances not otherwise simply to be distinguished from each other. Thus, Croner (Zeitsch. f. Angew. Chemie 1932 (1926)) points out that mineral oils possess a strong blue fluorescence under the ultra-violet light, while vegetable oils do not. Popp (Zeitsch. f. Angew. Chemie 1046 (1926) and Chem. Zeitung 588 (1926) finds that starchy materials, etc., can be distinguished from each other, wheat and rye meal showing a distinct blue luminescence, while barley meal appears dull white, potato meal grayish-brown; pea meal shows a rose luminescence, bean meal a bluish green-blue luminescence. A study of artificial and natural tanning agents has further been made by Gerngross, Ban, and Sandor (Zeitsch. f. Angew. Chemie 1028 (1926)).

The author has examined various industrial fibers by the same means, and has found characteristic distinctions to exist between them under ultra-violet light. The results in brief are as follows:

(1)—Bleached wool, in the form of zephyr yarn, shows the strongest luminescence, a bright bluish-white; by daylight, white.

(2)—Natural silk (organzine, de-basted), luminesces light bluish; by daylight, white.

(3)—Unbleached, light-colored wool (first carding), luminesces light bluish, in about the intensity of (2); by daylight, pale yellowish.

(4)—Sthenose (artificial silk treated with formaldehyde) luminesces bright yellow; by daylight, brownish.

(5)—Cotton, mercerized, bleached, luminesces light yellowish; by daylight, white.

(6)—Acetate Silk (Aceta G. m. b. H.) luminesces blue-violet; by daylight, white.

(7)—Roving luminesces bluish, plainly shading toward yellow, the luminescence in part overlaid by yellow; by daylight, brownish-yellow.

(8)—American raw cotton (first quality), pale yellow, luminesces white; by daylight, pale brownish, almost white.

(9)—Cupro silk (Bamberg silk) luminesces reddish-white with violet shadow; by daylight, white, opalescent.

(10)—Viscose silk luminesces sulphur yellow with violet shadow; by daylight, brownish-white.

(11)—Nitro silk (600-800 denier, untwisted) luminesces flesh-color; by daylight, yellowish-white.

(12)—Mako cotton (Mako 40-I brown) appears brown in both ultra-violet and ordinary light.

(13)—Mako cotton boiled out with soda (quality as in (12)) appears in ultra-violet light a dark, obscure brown, with a weak violet shade; by daylight, brown.

(14)—Unbleached, mercerized Mako cotton (as in (12)) appears in ultra-violet light a very dark violet-brown; by daylight, brown.

In the above table the gray-content of the luminescence-colors increase steadily from 1 to 14, but it has not been determined whether the increase is regular; between 3, 4, and 5 the difference in brightness is only slight, but great between 12 and 13.

It is not possible to distinguish between the different sorts of cotton, through their luminescence, with greater certainty than by daylight. The luminescence is conditioned, first, by the cellulose, which is the same substance chemically in all sorts of cotton, and, second, by the color of the sample in daylight, which is governed by the greater or less amount of coloring-matter present. This daylight color is of decisive influence upon the luminescence; thus, a dark American sort may have a luminescence hardly to be distinguished from that of a light Mako cotton. In a similar way, unbleached linen, hemp, jute, kapok, ramie, cannot well be distinguished decisively.

On the other hand, the artificial fibers can easily be differentiated by ultra-violet light (of course, in the undyed condition). The distinctions are given in the foregoing table (more elaborately in the original article). It should be remarked that the distinction between luminescence and shadow is best noticed if the material is not examined in loose strands, but twisted up into a small skein for examination.

Bleached linen can easily be distinguished from bleached cotton, even in mixed weaves, by the much yellower color.

Acid Azo Dyestuffs

Eng. Pat. No. 258,894; *I. G. Farben-Ind. A.-G. (F. Bayer & Co.)*—By coupling tetrazotized 2-2'-dichlor-benzidine or m-tolidine first with m-phenylene-diamine-4-6-disulphonic acid, and then with 2-amino-8-naphthol-6-sulphonic acid in alkaline reaction. The products are reddish-brown acid dyestuffs fast to milling. Yellower shades are obtained by using aryl or alkyl derivatives of the last component.

Secondary Disazo Dyestuffs

Eng. Pat. No. 281,767; *British Dyestuffs Corporation, Ltd., J. Baddiley, P. Chorley, and R. Brightman*—New disazo dyestuffs, dyeing level browns, blues, or blacks direct on viscose silks, are formed by coupling diazotized amino-azo compounds, or their homologues, or sulphonic or carboxylic derivatives of the same, to N-aryl, -aroyl, or -acidyl derivatives of 2-amino-8-naphthol-6-sulphonic acid, in alkaline or acid solution.

New Dyestuffs for Cellulose Esters

Eng. Pat. No. 281,114—*C. M. Barnard and The British Alizarine Company*—New dyestuffs of uncertain structure, produced by fusing azo-dyestuffs or azo-substances containing one or more amino-groups, but no sulphonic groups, with citric acid. The products are water-soluble. As example, the compound formed by coupling diazotized p-amino-azo-benzene to beta-naphthol, treated thus, gives an orange-brown dyestuff, identical (?) with that obtained by fusing p-nitro- aniline with citric acid, reducing the nitro-group, diazotizing, and coupling with beta-naphthol. Such water-soluble products, if not of too high molecular weight, are suitable for use upon fibers of cellulose esters.

Also (Eng. Pat. No. 281,213) the fusion of 7-7'-diamino-thio-indigo with citric acid gives a water-soluble dyestuff which dyes cellulose acetate violet-red. Similar indigoid or thio-indigoid dyestuffs, containing free amino-groups but no sulphonic groups, give similar valuable products.

Mordant Dyestuffs

Eng. Pat. No. 270,308—*I. F. Farben-Ind. A.-G.*—Chrome dyestuffs, dyeing wool in a single bath olive-green, are produced by coupling diazotized substituted o-amino-phenols to 2-6-dihydroxynaphthalene-3-carbonic acid. Examples include 4-chlor-2-amino-phenol-6-sulphonic acid, 4-nitro-2-amino-phenol, and 2-amino-phenol-4-sulphonic acid. The dyeings are fast to washing, milling, and potting.

Acid Dyestuffs of Anthraquinone Series

Eng. Pat. No. 280,637—*W. Capmael and I. G. Farben-Ind. A.-G.*—Reaction between 1-amino-4-halogen-anthraquinone-2-sulphonic acid and alkyl or aralkyl amines, such a n-butylamine or benzylamine, can be accomplished at a low temperature (80°-90° C.) at ordinary pressure, using copper as a catalyst. Under these conditions the halogen atom reacts without the sulphonic acid group being affected. The resulting compounds are blue acid dyestuffs.

Trisazo Dyestuffs

Eng. Pat. No. 259,970—*I. G. Farben-Ind. A.-G.*—The first component may be the sulphonic acid of a p-nitro-amine, or of a mono-acidyl-p-diamine. Such a compound is diazotized and coupled to a second component containing a free amino-group, such as the Cleve acids, or 1-amino-2-naphthol-ethyl-ether-6-sulphonic acid. These mono-azo dyestuffs are diazotized and coupled to a third component, which should be an amino-naphtholsulphonic acid which carries a free heteronuclear amino-group, as for example the p-amino-benzoyl derivative or J-acid or gamma acid. These disazo dyestuffs are then diazotized, and coupled to a fourth component, such, for example, as 1-phenyl-3-methyl-5-pyrazolone, or methylk-etol. A free amino-group is then introduced into the product, in the nucleus of the first component, by reducing the nitro-group or by hydrolyzing the acidyl-amino group. The products thus obtained dye cotton direct in green shades, and the dyeings can be diazotized on the fiber and developed with beta-naphthol or 1-phenyl-3-methylprazolone, with no very serious alteration of the shade, but with enhanced fastness-properties.

Chrome Mono-Azo Dyestuffs

Eng. Pat. No. 263,816—*I. G. Farben-Ind. A.-G.*—By coupling the diazo-salt of 5-nitro-2-amino-phenol or of 5-nitro-4-chlor-2-amino-phenol to 1-(2'-hydroxy-3'-carboxy-5'sulphophenyl)-3-methyl-5-pyrazolone, or the corresponding 3-carboxylic acid or its esters.. The products dye wool yellowish-red to brownish-red, these colors being converted to bluish- or claret-reds by afterchroming, these results being claimed to be fast to light, milling, and potting. The dyestuffs can also be printed upon cotton with a chromium mordant, the prints (reds) being fast to washing and chlorine.

Synthetic Tanning Agents

Eng. Pat. No. 266,697—*I. G. Farben-Ind. A.-G.*—Products are produced by reacting esters of ortho-hydroxy-aryl-carbonic acids with such sulphonating

agents as will react with and remove the water formed, thus avoiding hydrolysis of the ester group. Such reagents are chlor-sulphonic acid, oleum, etc. The products are brittle resins at the ordinary temperature, are easily soluble in water, and effective as tanning agents.

Disazo Dyestuffs for Cellulose Silks

Eng. Pat. No. 283-319—*British Dyestuffs Corp., Ltd., and J. Baddiley*—By coupling diazotized p-nitro-aniline-o-sulphonic acid with alpha-naphthylamine or cresidine, then diazotizing these mono-azo dyestuffs and coupling them to J-acid or its N-alkyl, aryl, or acyl derivatives, in either acid or alkaline solution. The products dye level blue shades on regenerated cellulose "silks."

FRENCH SHOW ENTERPRISE IN DYE DEVELOPMENTS

Research in the dyestuff industry of France produced genuine results last year, according to information supplied by Assistant Commercial Attache Daniel Reagan of Paris. Sixteen new intermediates were developed at the Oissel and Villers-St. Paul plants of the Etablissements Kuhlmann during 1927. The company introduced 85 new kinds of dyestuffs on the market, representing about 40 new types. Concentration in this line was chiefly on vat dyes of the solenthrene series and on dyestuffs for use on acetate rayon and furs.

The total production of dyestuffs amounted to 8,000 metric tons (as compared with 9,900 tons in 1926), of which 3,500 tons were indigo dye (20 per cent paste) as compared with 4,200 tons in 1926; 2,500 tons of nitrogenous dyes (3,300 tons in 1926), and 2,000 tons of alizarine and other dyes (2,400 tons in 1926).

If to the above production of dyestuffs proper, the output of intermediate products at the Oissel and Villers-Saint-Paul plants be added (that is, 9,000 tons) and also the production of 500 tons of hydrosulphate, the total general production of the organic plants reached 17,500 tons.

SWISS DYE PLANTS SPECIALIZE AND EXPORT MORE

High tariff duties and the competition of foreign manufacturers are causing dyestuff firms of Basle, Switzerland, to turn over the manufacture of certain products to their branch factories in the United States, Great Britain, Germany and elsewhere. The local plants are thus able to specialize in other products which can be produced at Basle with advantage, says a dispatch to the Department of Commerce from Vice-Consul Albert W. Scott of Basle.

During the first five months of 1928 (statistics for June not yet available) Swiss exports of aniline dyes were valued at 30,628,000 francs ($5,911,000), compared with 28,280,000 francs ($5,458,000) for the first five months of 1927. The increase of about $453,000 was made chiefly during the March quarter. Practically all of the dyes exported from Switzerland are manufactured in Basle.

The fact that the principal Basle dye companies recently declared dividends varying from 15% to 25%, based upon profits for the last fiscal year, shows that dye manufacturing remains one of the most profitable of Swiss industries, despite the severe competition it must meet and the restrictions which many countries impose upon imports of dyes.

The Textile School of North Carolina State College, Raleigh, N. C., opened its fall session on September 14.

Dean Thomas Nelson says that the prospects for the fall session are encouraging, that the enrolment will show a considerable increase over last year. Practically every cotton manufacturing state in the South will be represented in the student body. There will also be students from the New England States, England and Mexico.

During the summer considerable new equipment has been added and two additional men have been employed who will devote their time to Textile Research.

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i. e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

DYESTUFF SALESMAN

Experienced dyestuff salesman, well known by entire textile, leather, paper industries, etc., in territory covered by him for many years, offers his services to first-class manufacturing concern. A-1 references given. Address: Classified Box 466, American Dyestuff Reporter.

TEXTILE CHEMIST

Textile chemist and dyer wants steady position. Eighteen years' experience. Thoroughly competent in all lines of bleachery work, including art silk mixtures and vat colors. Can supervise development work or handle production. Address: Classified Box 475, American Dyestuff Reporter.

DEMONSTRATOR

Wanted: Young, energetic man to demontrate an efficient new chemical product widely used in textile processing. State experience, salary and other details in first letter. Address: Classified Box 481, American Dyestuff Reporter.

DYE SALESMAN

Aniline Dye and Specialty Salesman wanted with experience and acquaintance with Philadelphia textile trade. Address: Classified Box 482, American Dyestuff Reporter.